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ABSTRACT

The objectives of the two-year project were to develop new occupational competency examinations for seven occupational areas--automotive mechanics, carpentry, chef, electrician (residential), industrial electronics, machine drafting, and machine trades--and subject the written examinations to a validation procedure. Vocational trade teachers were selected and employed as consultants for development of the examinations. The validation procedure consisted of tradesmen from each of the seven areas completing the examination for their area, then a statistical analysis of the results to produce normative tables in percentile form and to produce instrument reliability data. It was concluded that the method for developing the occupational competency examinations was valid since three of the examinations (carpentry, chef, and electrician) were fully completed, and the remaining four can be completed with further development. (Although, in the interest of preserving their security, the instruments are not contained in the report, the procedure used in their development is outlined, the scope of the written examination for each area is itemized, sample items are provided, and the statistical tables of results are made available.) (AG)

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DEVELOPMENT OF EXAMINATIONS FOR ASSESSMENT OF OCCUPATIONAL COMPETENCY

FINAL REPORT

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1615 Stanley Street
New Britain, Connecticut

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

June 1973

CONNECTICUT STATE DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH AND PLANNING UNIT
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Points of view or opinions stated do not necessarily represent official opinions or policy of state or federal governmental agencies, as the writers are encouraged to express freely their professional judgment in the conduct of this project.

CONNECTICUT STATE DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH AND PLANNING UNIT
HARTFORD, CONNECTICUT

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PREFACE

The primary thrusts of this two year project were to develop new occupational competency examinations and subject the written examinations to a validation procedure. The occupational areas focused upon were: Automotive Mechanics, Carpentry, Chef, Electrician (Residential), Industrial Electronics, Machine Drafting, and Machine Trades.

The study was jointly carried out under the auspices of the Connecticut State Department of Education, Division of Vocational Education and Central Connecticut State College, Department of Vocational Technical Education. Special gratitude is extended to Mr. Frederick Okula, Consultant for Trade Education, who devoted a great deal of time to the project activities. His practical suggestions at critical times helped greatly in carrying the project to completion.

The evaluation instruments developed through this project are not included in this report in an attempt to maintain their security. Persons having a need for specific instruments described in the report should mail their request to Chairman, Department of Vocational Technical Education, Central Connecticut State College, New Britain, Connecticut 06050.

Background

Occupational examinations have widespread application in many settings and are used for various purposes. Employment screening, occupational licensing, and educational credit-by-examination programs are but a few of the applications for occupational competency examinations. The idea central to competency testing, regardless of where it is used, is to yield data that will aid in making decisions regarding a person's capability to effectively function within a given occupation. It becomes apparent that instruments for evaluating occupational competence are needed and development should be undertaken.

Objectives

The general goal of this project was to design and apply a systematic procedure for development and validation of occupational examinations. The procedure was to be applied to the occupational areas of Automotive Mechanics, Carpentry, Chef, Electrician (Residential), Industrial Electronics, Machine Drafting and Machine Trades. The objectives of the project were to:

1. Define the parameters of written and performance examinations for seven selected occupations and develop the instruments.
2. Evaluate the written examinations by subjecting them to a validation procedure.

Procedures

Vocational trade teachers were selected and employed as consultants for development of the examinations. The trade teacher consultants were organized into teams which met for weekly work-

shop sessions. The trade teacher consultants were provided with activity coordination by additional personnel including supportive services of a measurements consultant.

Written examinations were subjected to a validation procedure. Tradesmen for each of the seven occupational areas were selected and completed the written examination for their respective trade area. Results of the administered examinations were statistically treated and analyzed to produce normative tables in percentile form and instrument reliability data. Examinee scores were reported in profile form.

Results

Written examinations for the seven selected occupational areas were completed. The examination design includes several occupational factors and consists of 200-255 multiple choice test items.

Three performance examinations were fully completed with the remaining four needing further development prior to utilization. The performance examinations consist of structured situations which require manipulative performance of the examinee. Examiner rating scales were designed to accompany the performance examinations.

The seven written examinations were administered to a total of 256 tradesmen as part of the instrument validation procedure. Four of the basic examinations produced reliability coefficients of .90 or greater and the three remaining instruments have coefficients of .84 or greater.

Conclusions and Recommendations

It was generally concluded that occupational competency examinations of reasonably good quality can be developed by employing trade teachers as consultants, organizing the consultants into workshop

teams, and coordinating the activities of each team. One source of examinees for examination validation is the population of craftsmen who have indicated interest in becoming vocational trade teachers. The validation process yields useful normative data which facilitates reporting of examinee scores.

Recommendations were made to continue the development of needed occupational examinations and to initiate a planned program of review and revision of existing instruments. Both of these activities should be coordinated by the National Project for Occupational Competency Testing to reduce duplication of efforts. An area needing exploration is that of testing the occupational competency of trade teacher applicants prior to their certification and employment in trade teaching positions.

INTRODUCTION

Need for the Project

The use of examinations for assessing a person's occupational competence has application within many settings and for a variety of purposes. Employers often administer occupational competency examinations to provide data useful for selection purposes when hiring personnel. Examinations are often used in the process of issuing licenses. Many of us have obtained a drivers license which more than likely involved the completion of a written and performance examination. The licensing of nurses, electricians, plumbers, cosmetologists as well as other occupations frequently involve examinations. Credit-by-examination procedures evolving in many educational institutions is another application for competency examinations. Some professional associations provide means for certifying the technical competence of their members through some form of occupational examination. The central idea of occupational competency testing is basically the same regardless of the setting within which it takes place. It is a data-gathering technique to aid in decisions pertinent to a person's capability to effectively function within a given occupation.

Probably the first large scale use of occupational tests was by the Army during World War I. The Army extensively utilized the idea of trade examinations as a means of assessing the quality of a person's occupational background for the purpose of classifying personnel. This early application of the trade testing idea prompted the use of occupational testing as an aid in the selection of instructors for trade and industrial education. (Barlow:215).

The development of examinations for assessing occupational competence of trade instructors has received considerable attention in recent years. The Occupation Competency Examination Project[1] certainly has been one of the prime forces for coordinating a nationwide effort in the development of occupational tests. Although the Project has been instrumental in producing several occupational examinations, there exists problems as to access of these instruments for use by the various agencies and institutions within the nation. In other words, several new instruments have been developed but a process for controlled utilization on a nationwide basis is yet to be implemented. Therefore, institutions having an immediate need for up-to-date occupational examinations are required to undertake the development of their own instruments. Such a project was undertaken in Connecticut to meet the State's needs of occupational competency testing for vocational instructors. This project was a cooperative endeavor between the Department of Education, Division of Vocational Education and Central Connecticut State College.

Objectives of the Project

The primary goal of this project was to design a systematic procedure for developing and validating occupational examinations. The proposed approach was executed in three phases as follows:

Phase I - Development of examinations.

Phase II - Administering the developed examinations to selected candidates.

Phase III - Scoring, analyzing and validating the examinations.

1. National Occupational Competency Testing Project
Plaza Seven, Office Building 1202, Route 7, Latham, New York.

Specifically, the objectives of the project were as follows:

Phase I - Examination development

1. Define the parameters of the written and performance examinations.
2. Develop the written and performance examinations.

Phases II and III - Administration and validation of examinations.

1. Define the normative population used for validating the examinations.
2. Select a small sample of examinees and administer the developed examinations on a pilot basis.
3. Revise examinations as necessary.
4. Select sample of examinees for normative administration of each instrument.
5. Analyze test data from normative administration to establish normative tables and reliability coefficients.

Scope and Limitations of the Project

The scope of this project was limited to the development and validation of occupational examinations for seven occupational areas. Phase I objectives were the basis for examination development during the summers of 1971 and 1972. During the summer of 1971 examination development for four trade areas was the focus of the project. The trade areas were Automobile Mechanics, Industrial Electronics, Machine Trades and Machine Drafting. In the summer of 1972 examination development was for the trade areas of Electrician (residential), Chef, and Carpentry. The overall intent of the project was to develop a procedure for developing new instruments as well as for updating existing ones,

and trying out the procedure for seven trade areas identified above.

The validation process (Phases II and III) involved only the written examinations and all examinees were Connecticut residents. No attempt was made to validate the developed performance examinations.

METHODS AND PROCEDURES

Project Coordination

The coordination of the overall project activities was the responsibility of the faculty coordinator. This person was responsible for selection of consultants, scheduling of workshop meetings as well as assisting and working with all project personnel. (See Appendix A). A measurements consultant and a computer programming consultant were selected and employed as resource persons to assist at various points throughout the entire project. The computer programming consultant assisted primarily with the computerized scoring of the written examinations. Services of the measurements consultant were utilized continually throughout the project especially on questions dealing with procedures for test constructing, selection of appropriate statistical techniques and critiquing of test items. The Consultant for Trade Education from the State Department of Education served as a resource person throughout the project and worked closely with the faculty coordinator. He assisted at the test development workshops, conducted test administration sessions and made recommendations in the selection of trade teacher consultants.

Trade Teacher Consultants

Trade teachers from vocational education programs were selected and employed as trade teacher consultants. (See Appendix A). The main criterion for selection of trade teacher consultants was that each have a background of work experience directly related to one of the trade fields selected for examination development. The trade teacher consultants were arranged into teams of three

men each. Each team focused on the development of a written and performance examination for one of the occupational fields. The overall project involved a total of 21 trade teacher consultants - seven three-man teams. A team functioned in two distinct dimensions in the accomplishment of the examination development tasks. Some of the time, individual team members were assigned tasks and worked independently of each other. At other times it seemed more effective to work in a group setting. The coordination of activities for each trade teacher consultant team took place in weekly workshop sessions.

Workshop Sessions

During the initial workshop session the faculty coordinator oriented the trade teacher consultants to the overall project and to the examination development tasks, (See Appendix B), that they were to perform. During this first meeting, the measurements consultant discussed some of the basic principles of test construction and suggested that the written examination scope (See Appendix C) be one of the first tasks undertaken by the trade teacher consultant team. A card format (See Appendix D) was introduced and a supply distributed to the trade teacher consultants for test item development. Suggestions for writing multiple-choice type test items were presented as this type of items was used exclusively in the written examinations (See Appendix E).

The workshop sessions were conducted on a weekly basis for six weeks to coordinate activities of each team of trade teacher consultants. The weekly workshop sessions provided a means for pooling individual team member accomplishments. Test items constructed were exchanged among the members of each team so that the items could be reviewed for correctness of content, clarity of

wording and verification of correct answer. The measurement consultant also critiqued many of the test items as examination development progressed. A final workshop task was selecting the appropriate test items in the assembly of the written examination.

The performance examinations were developed in much the same manner as the written examinations. Occupational performance tasks were identified (See Appendix F) and performance test situations were developed. This involved identification of evaluation criteria for each performance test job and the design of several rating scales (See Appendix G) that would be used by the examiner.

Validation of Written Examinations

This project involved the development of written and performance examinations for selected occupational areas. However, only the written examinations were submitted to a validation procedure.

Upon completion, each of the written examinations were reproduced and administered to a small group (2-8) of trade teachers on a pilot administration basis. Examinees recorded their answers to the test items on IBM data cards using mark sensing pencils. The data cards were computer scored yielding item analysis data. Examinees were also instructed to identify confusing or unclear items by writing comments directly on the test booklets. These comments plus the item analysis data provided a means of identifying ambiguous items and subsequent revision.

Potential examinees for the normative administration of each examination were identified and contacted by letter (See Appendix H). The letter was accompanied by an examination registration form (See Appendix I) and a stamped and pre-addressed return envelope. Persons

interested in participating in the examination were asked to return the completed registration form. The potential examinees were identified through the trade instructor application for employment files housed in Connecticut's Bureau of Vocational Technical Schools. Additional potential examinees who were not in the Bureau files were also contacted.

The examinations were administered during the evening in vocational technical schools at three different locations within the state. Examinees were instructed on how to record their answers on the IBM data card using a mark sensing pencil. Although the examinations were not rigidly timed, examinees were instructed to try and complete the examination within three hours. Examinees were informed that a copy of their scores would be mailed to them for their information.

After all examinations had been administered the data cards were computer processed resulting in print-outs of test scores for each examinee and an item analysis of the test. The computer print-out scores were transposed into percentiles and normative tables (See Appendix J) were developed. A form for reporting examinee test scores in a profile arrangement (See Appendix K) was developed for each of the occupational examinations. Statistical measures for indicating examination reliability were selected and applied to the examination data.

RESULTS AND FINDINGS

Instruments Developed

The purpose of this project was to develop evaluation instruments, both written and performance types, for selected occupational areas and apply a validation procedure to the written examinations.

Seven written examinations were developed. The number of test items and occupational factors included in each of the instruments is shown in Table 1. Some of the written examinations included occupational factors which were identified as specialty indicators. The specialty indicators were considered as occupational content that may not be common knowledge possessed by the average person in that specific occupational area. Therefore, some of the examinations are designed with several factors making up the basic examination plus additional factors as indicators of a specialty.

Table 1. Number of test items by occupational factor for each written examination.

Examination title and Occupational Factors	Number of Test Items
Automotive Mechanics	
Engine	40
Fuel and Exhaust Systems	30
Electrical Systems	60
Drive Train	30
Front and Rear Suspension	20
Brakes	20
Air Conditioning (Specialty indicator)	20
Total	220

Table 1 - continued

Examination Title and Occupational Factors	Number of Test Items
Carpentry	
Shop Work	48
Concrete Form Work	27
Framing	60
Exterior Finish	39
Interior Finish	36
Total	210
Chef	
Kitchen Management	25
Salad Preparation, Cold Plates & Sandwiches	38
Meat, Fish & Poultry	75
Vegetable & Starch Cookery	37
Sauces	50
Desserts & Beverages	25
Total	250
Electrician (Residential)	
Electrical Theory	70
Installations & Applications	130
Total	200
Industrial Electronics	
Electron Physics & Magnetism	30
Direct Current	40
Alternating Current	50
Control Devices	40
Basic Circuits	40
Pulse Circuitry (Specialty indicator)	25
Communication (Specialty indicator)	30
Total	255

Table 1 - continued

Examination Title and Occupational Factors	Number of Test Items
Machine Drafting	
Basic Drafting	80
Working Drawings	40
Power Transmission	40
Materials & Processes	40
Tool Design (Specialty indicator)	30
Electronics (Specialty indicator)	20
Total	250
Machine Trades	
General Shop Practice	40
Measurements & Inspection	20
Lathe	20
Milling	50
Grinding	50
Metals & Materials	20
Remote Controlled Machining (Specialty indicator)	20
Tool & Die Making (Specialty indicator)	35
Total	255

Efforts toward the development of performance examinations did not yield the same degree of progress as did the written examination development. Table 2 reveals that during the initial summer of project operation only partial completion of the performance examinations was accomplished. The lack of a well established performance examination format plus time limitations of a six week summer session to develop examinations for four different occupations were contributing factors for incompletion of some performance instruments. Experiences of the first summer of examination development resulted in a more clearly defined procedure for developing performance examinations. This procedure provided direction for the second summer of the project where

development of three performance examinations were attempted and totally completed.

Table 2. Percent of Completion of Performance Examinations

Examination Title	Percent Completion (Approx.)
Summer 1971	
Automotive Mechanics	25%
Industrial Electronics	25%
Machine Drafting	75%
Machine Trades	25%
Summer 1972	
Carpentry	100%
Chef	100%
Electrician (Residential)	100%

Population of Examinees

The population of potential examinees was defined as any Connecticut worker who had completed eight or more years of work experience within the specific occupation being examined. Table 3 shows the number of persons contacted to generate a sample of examinees. Most of the potential examinees were contacted by letter which described the occupational examination program and requested their participation. 323 completed registration forms were received resulting in a 55% return of the total number contacted. 256 examinees actually appeared at one of the sessions and completed an examination which was about 80% of those registered.

Table 3. Number of persons contacted, participants registered and examinees who completed the written examination for the seven occupational areas.

Examination Title	Number Contacted	Number Registered	Number Examined
Automotive Mechanics	69	45	37
Carpentry	57	33	24
Chef	33	14	12
Electrician (Residential)	42	13	8
Industrial Electronics	91	54	42
Machine Drafting	130	71	60
Machine Trades	164	93	73
Totals	586	323	256

The data in Table 4 shows the number years of occupational experience possessed by each group of examinees. With the exception of six persons, each examinee had a minimum of eight years of work experience within the occupation examined. It is suspected that some of the examinees indicating less than eight years of trade experience may have misunderstood directions at the test session. Instead of listing their total years of work experience they may have indicated only the length of experience with their current employer. The means for the examinee groups spread from 14.7 years for industrial electronics to 20.9 years for chef.

Table 4. Number years of work experience possessed by examinees who completed the written examinations.

	Years of Work Experience		
Examination Title	Lowest Number	Highest Number	Mean
Automotive Mechanics	8	47	20.5
Carpentry	11	37	20.6
Chef	8	35	20.9
Electrician (Residential)	1	36	15.8
Industrial Electronics	4	37	14.7
Machine Drafting	1	40	17.7
Machine Trades	5	35	20.1

Examination Administration Times

Examinees were instructed at the start of the examination session to attempt completion of their respective written examination within three hours. If the full three hours were not needed, they could leave when finished. At the end of the three hour session if persons were still working, they were permitted to continue for an additional thirty minutes since the examinations tend to be more power oriented rather than speed. However, an attempt to establish suggested administration times was undertaken.

The actual amount of time used to complete each examination was recorded for each examinee. Table 5 lists the fastest and slowest times used by examinees as well as a suggested administration time for each written examination.

Table 5. Amount of time used by examinees for completing examinations and suggested administration times.

	Minutes of Time		
Examination Title	Slowest	Fastest	Suggested
Automotive Mechanics	192	102	177
Carpentry	175	95	166
Chef	149	70	139
Electrician (Residential)	165	78	152
Industrial Electronics	210	113	190
Machine Drafting	195	122	185
Machine Trades	195	90	185

The completion times recorded for each examinee were used in establishing a suggested administration time for each examination. The suggested times, shown in Table 5, were calculated by taking completion times of the slowest 20% of all examinees for each examination group. One half of these completion times, the very slowest 10% of examinees, were discarded. The remaining 10% of the examinee

times were averaged to establish the suggested times for administration of each examination. The suggested times range from about 2-1/4 hours for the chef examination to approximately 3-1/4 hours for the industrial electronics examination.

Treatment of Examination Results

The data in Table 6 summarizes the performance of examinee groups for each of the written examinations. The raw scores indicate the number of test items correctly answered by examinees. These raw scores were transposed to percentile ranks to establish the normative tables (See Appendix J) thereby providing a means for interpreting raw scores for any individual examinee. Percentile ranks are used frequently in reporting results of standardized tests and are relatively easily interpreted by examinees. Therefore, this mode of reporting was considered appropriate for the occupational examination scores.

The formula used to transpose the raw scores to percentile ranks (Lyman:102) follows:

$$PR = \frac{cf_{mp} \times 100}{N}$$

Where PR = percentile rank for the raw score value

cf_{mp} = cumulative frequency to midpoint of score

N = number of cases.

Table 6 Examination results data

* Number in parentheses indicates number of test items.

Examination Titles & Occupational Factors	Raw Score Range	Mean	Standard Deviation	Number of Examinees	Reliability Coefficient
Automotive Mechanics					
Engine (40) *	17-35	28.7	4.0	37	.599
Fuel & Exhaust Systems (30)	14-26	20.9	3.3	37	.543
Electrical Systems (60)	12-49	31.6	8.9	37	.872
Drive Train (30)	11-26	18.5	4.9	37	.809
Front & Rear Suspension (20)	7-16	11.9	3.3	37	.695
Brakes	3-16	12.1	3.1	37	.638
Basic Examination (200)	90-161	124.8	18.1	36	.894
Air Conditioning - Specialty (20)	4-16	9.4	3.5	27	.681
Carpentry					
Shop Work (48)	23-43	35.5	4.6	24	.705
Concrete Form Work (27)	19-27	23.2	2.4	24	.538
Framing (60)	27-51	43.6	5.3	24	.733
Exterior Finish (39)	24-38	31.4	3.3	24	.650
Interior Finish (36)	14-35	28.7	4.6	24	.799
Basic Examination (210)	130-186	162.4	16.0	24	.841
Chef					
Kitchen Management (25)	15-23	18.3	2.9	12	.629
Salads & Cold Plates (38)	13-33	48.3	6.5	12	.726
Vegetables & Starch Cookery (37)	20-30	24.9	10.2	12	.458
Meat, Fish & Poultry (75)	36-58	48.3	6.5	12	.726
Sauces (50)	23-45	33.2	5.7	12	.792
Desserts & Beverages (25)	12-20	16.1	2.0	12	-.036
Basic Examination (250)	136-204	165.4	20.4	12	.909

Table 6 - continued

Examination Titles & Occupational Factors	Raw Score Range	Mean	Standard Deviation	Number of Examinees	Reliability Coefficient
Electrician (Residential)					
Electrical Theory (70)	44-66	54.6	7.6	8	.883
Installations & Applications (130)	52-92	70.0	13.5	8	.909
Basic Examination (200)	158-101	124.6	17.0	8	.900
Industrial Electronics					
Electron Physics & Magnetism (30)	8-28	21.6	4.3	42	.636
Direct Current (40)	11-38	32.1	5.7	42	.881
Alternating Current (50)	15-48	34.9	9.9	42	.930
Control Devices (40)	9-33	23.3	7.1	42	.878
Basic Circuits (40)	8-36	23.1	7.9	42	.902
Basic Examination (200)	81-179	138.7	26.2	40	.957
Pulse Circuitry - Specialty (25)	2-23	13.4	5.0	37	.838
Communication - Specialty (30)	3-27	17.6	6.7	36	.890
Machine Drafting					
Basic Drafting (80)	37-73	53.8	11.2	60	.910
Working Drawings (40)	14-32	23.0	5.9	60	.826
Power Transmission (40)	7-33	21.1	6.9	60	.855
Materials & Processes (40)	7-32	21.0	6.3	60	.827
Basic Examination (200)	79-154	121.1	18.8	56	.905
Tool Design - Specialty (30)	6-26	16.4	5.6	49	.830
Electronics - Specialty (20)	1-16	14.8	3.8	45	.786

Table 6 - continued

Examination Titles & Occupational Factors	Raw Score Range	Mean	Standard Deviation	Number of Examinees	Reliability Coefficient
Machine Trades					
General Shop Practice (40)	18-37	27.6	3.9	73	.581
Measurements and Inspection (20)	10-20	15.7	1.8	73	.200
Lathe (20)	9-20	16.8	2.3	73	.587
Milling (50)	16-44	36.1	4.4	73	.635
Grinding (50)	17-43	33.6	4.9	73	.655
Metals & Materials (20)	7-19	12.9	3.2	73	.643
Basic Examination (200)	98-171	142.5	15.7	73	.876
Remote Control Machine Specialty (20)	1-14	9.1	3.4	69	.680
Tool & Die Making Specialty (35)	1-26	15.2	5.4	71	.787

Reliability

As used in the subject of testing, the term "reliability" always means stability or consistency. Test reliability is the consistency of scores obtained by the same person when retested with the identical test. One method employed to determine examination reliability is based upon the consistency of the examinees' responses to all items in the examination. The Kuder-Richardson internal consistency reliability coefficient is a commonly used estimate of reliability of a test. Reliability coefficients were calculated for each written examination (See Table 6) using Tucker's Modified Kuder-Richardson formula (Guilford:382), given below:

$$r = \left(\frac{n}{n-1}\right)\left(\frac{\sigma_t^2 - n\bar{p}\bar{q} + n\,\sigma_p^2}{\sigma_t^2}\right)$$

Where r = reliability coefficient

n = number of items in the test

σ_t^2 = variance of the total test scores

$\bar{p}$ = mean of the proportion of correct responses for all items in the test

$\bar{q}$ = $1 - p$

σ_p^2 = variance of the proportion of correct responses for all items in the test

Reliability coefficients were computed for all occupational factors, which are essentially subtests, and for the basic examinations. The basic examination is actually a composite of its subtests, except for specialty areas which are not pooled into the basic examination score. Standardized test developers have traditionally not been satisfied with reliability coefficients of less than .90. Using this figure as a benchmark, the data in Table 6

reveals that very few of the subtests have reliabilities that reach this standard. However, four of the basic examinations have coefficients of .90 or greater and the three remaining basic examinations have coefficients of .84 or greater.

Validity

Probably the most important question that needs to be raised regarding any occupational examination concerns its validity. This test characteristic focuses on the following question. "Does the test measure what it was designed to measure?" Validity is not an absolute characteristic of a measuring instrument; it is relative to the test utilization. The same test may be used for several different purposes and its validity may vary from high to low depending upon the purpose. Validity, therefore, must be defined in terms of the purpose that is to be served by the particular instrument employed.

The written examinations developed through this project are intended as a device for assessing a tradesman's knowledge of technical aspects for the specified occupational areas. These examinations are designed to discriminate between a tradesman and others performing at differing levels of capability.

Several kinds of validity are identifiable and there are a number of ways of trying to establish its degree of existence. Often the assessment of a tests validity involves a judgment and critical review of the test itself. Indicators of content validity are considered appropriate for occupational achievement tests. This focuses on the instruments capability of measuring the skills and technical

information which characterize the competent tradesman.

The written examinations resulting from this project were designed and developed by vocational trade instructors. These instructors all had several years of work experience in the trade prior to assuming a teaching position to teach their trade. A person teaching others his trade is constantly faced with reviewing technical knowledges and skills of that occupation. Therefore, it seems reasonable that three trade teachers, all of the same trade area, working together on examination development for their occupation would yield an instrument representative of the trade. In developing the scope of each examination occupational analysis materials were used as guidelines to assure representative content in the instruments. Weighting of occupational factors in each examination served to accent the important trade content and diminish the trivia. Effort was made to write test items that were worded in tradesmen language and avoid the textbookish statements as much as possible.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The thrust of this project was to develop written and performance occupational competency examinations for selected trade areas. In addition, the written examinations were to be evaluated by subjecting them to a validation procedure. The findings of this project yield evidence to support the following conclusions:

1. That employing teams of trade teachers as consultants to perform occupational examination development activities is an effective and productive approach. The three-man teams with access to supportive personnel and guided by a basic procedure for examination development yields acceptable results.
2. That written occupational examinations with a high degree of statistical reliability of the composite scores can be developed using the procedure applied in this project.
3. That occupational competency performance examinations be composed of several independent tasks each involving relatively short periods of time, rather than employing a single complex job requiring several hours for completion. The total performance examination time may vary from one occupation to another but 3-5 hours of performance seems reasonable for many occupations and should provide for representative content sampling.

4. That occupational competency written examinations can be evaluated by administering them to craftsmen who are potential vocational trade teachers.

5. That craftsmen who are interested in being considered for employment as vocational trade teachers will cooperate by completing a written examination in their trade areas.

6. That the Connecticut State Department of Education, Division of Vocational Education and Central Connecticut State College, Department of Vocational Technical Education can work cooperatively in the development of occupational examinations and to the administration of the written examinations.

7. That applicants seeking employment as trade teachers in Connecticut's vocational-technical schools be expected to complete a written examination in their trade area to provide additional applicant information to aid in employment decisions. An applicant's written examination scores provide data useful to persons responsible for making employment decisions of trade teachers.

8. That examinee scores for written examinations can be reported in a profile format which indicates a tradesman's strong and weak areas of occupational technical knowledge (occupational factors). The separate occupational factors may also be pooled to yield a person's overall score (composite).

9. That normative data in percentile form can be derived for written occupational examinations to facilitate the reporting of examinee scores.

Recommendations

The following recommendations are made regarding occupational examination development and utilization of examination data:

1. That the Connecticut Division of Vocational Education support the National Project for Occupational Competency Testing and utilize their evaluation instruments whenever feasible to meet Connecticut's needs for occupational competency testing. The National Project seeks to reduce the duplication of efforts and monies in occupational examination development and coordinate activities on a nationwide basis. Connecticut should continue with occupational examination developmental activities but studies should be coordinated with efforts of the National Project.

2. That occupational examinations be subjected to a planned program of review and revision. Occupational examinations have for too many years been permitted to become out-dated and unrepresentative of the current content of occupations. Possibly on a cycling basis of every five years an occupational examination should be critically reviewed and new normative data established. The National Project should coordinate and provide funding to implement such a planned review program.

3. That a program for occupational competency testing of applicants seeking employment as trade teachers in Connecticut's vocational-technical schools be further explored. Persons involved in the employment of trade teachers have a direct need for unbiased information relative to the applicant's occupational competence.

4. That occupational competency be verified through an examination procedure prior to granting a certificate to teach trade or occupational subjects in Connecticut public schools.

5. That further investigation be performed seeking evidence to verify or disprove that a minimum of 8 years trade experience is necessary to effectively function as a skilled trades teacher in Connecticut. It would seem that the quality of the person's occupational experience be a more important factor than the number of years acquired.

6. That dialogue be established with the occupational licensing agency to assess the feasibility of joint efforts and funding for occupational examination development.

BIBLIOGRAPHY

Baldwin, Thomas S. The Development of Achievement Measures for Trade and Technical Education. University of Illinois, Urbana, 1968.

Barlow, Melvin L. History of Industrial Education in the United States. Chas. A. Bennett Co., Peoria, Illinois, 1967.

Guilford, J. P. Psychometric Methods. McGraw-Hill Book Company, New York, 1954.

Kazanas, H. C. and L. D. Kieft. An Experimental Project to Determine More Effective Vocational Teacher Certification Procedures in Michigan by Competency Examinations. Department of Industrial Education, Eastern Michigan University, Lansing, August, 1966.

Koenigsberg, Lewis A. and Robert R. Reilly. An Investigation of The Reliability and Validity of Selected Occupational Competency Examinations and their Use in Evaluating Prospective Trade and Industrial Teachers. State University of New York, Oswego, June 1968.

Lavda, Donld Paul. Factors Related to the Granting of College-University Credit for Trade and Industrial Experience in Institutions Offering Industrial Education. Iowa State University of Science and Technology, Ames, 1966.

Lyman, Howard B. Test Scores and What They Mean. Prentice-Hall Publishers, Inglewood Cliffs, New Jersey, 1971.

Micheels, William J. and M. Ray Karnes. Measuring Educational Achievement. McGraw-Hill Book Company, New York, 1950.

Miller, John G. Predictive Testing for Entrance in Vocational-Technical Schools. New York University, Center for Field Research and School Services, New York, August 1968.

Ohio State Department of Education. Occupational Competency Tests: Procedures and Instructions for Construction and Review. Trade and Industrial Education Service, Ohio State University, Columbus, 1962.

Panitz, Adolph and C. Thomas Olivo. The State of the Art of Occupational Competency Testing. Department of Vocational Technical Education, Rutgers University, New Brunswick, New Jersey, June 1970.

_____. Directions for: Area Test Center Coordination, Test Development, Test Administration. Department of Vocational-Technical Education, Rutgers University, New Brunswick, New Jersey, April 1971.

Appendix A

Examination Development Consultants and Resource People

Dr. Harry LaPine
Central Connecticut State College
New Britain, Connecticut
— Measurements Consultant

Mr. Frederick Okula
Consultant for Trade Education
State Department of Education
Hartford, Connecticut
— State Department of Education Resource Person

Dr. Raymond Ross
Central Connecticut State College
New Britain, Connecticut
— Faculty Coordinator

Dr. Robert Thompson
Central Connecticut State College
New Britain, Connecticut
— Computer Programming Consultant

Automotive Mechanics - Trade Teacher Consultants

Mr. Norman French
Automotive Mechanics Instructor
Windham Technical School
Willimantic, Connecticut

Mr. Earl White
Automotive Mechanics Instructor
Windham Technical School
Willimantic, Connecticut

Mr. Robert Smith
Related Subjects Instructor
A. I. Prince Technical School
Hartford, Connecticut

Carpentry - Trade Teacher Consultants

Mr. Paul Carbone
Carpentry Instructor
Windham Technical School
Willimantic, Connecticut

Mr. William Peowski
Carpentry Instructor
Windham Technical School
Willimantic, Connecticut

Mr. James Derwin
Carpentry Instructor
Henry Abbott Technical School
Danbury, Connecticut

Chef - Trade Teacher Consultants

Mr. E. Frank Gronda
Food Service Instructor
E. C. Goodwin Technical School
New Britain, Connecticut

Mr. James Padam
Food Service Instructor
Bullard Havens Technical School
Bridgeport, Connecticut

Mr. Frank Lattucca
Food Service Management Instructor
Manchester Community College
Manchester, Connecticut

Electrician (Residential) - Trade Teacher Consultants

Mr. Harold Darrow
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Oliver Wolcott Technical School
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Mr. Fred DiLeo
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Electronics (Industrial) - Trade Teacher Consultants

Mr. John Battista
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Mr. Robert Lougee
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Mr. Andrew Jakab
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Machine Drafting - Trade Teacher Consultants

Mr. Fred Caruso
Machine Drafting Instructor
Emmett O'Brien Technical School
Ansonia, Connecticut

Mr. Edwin Schwietzer
Machine Drafting Instructor
Kaynor Technical School
Waterbury, Connecticut

Mr. Robert Larese
Machine Drafting Instructor
E. C. Goodwin Technical School
New Britain, Connecticut

Machine Trades - Trade Teacher Consultants

Mr. Fred Peterson
Tool & Die Instructor
E. C. Goodwin Technical School
New Britain, Connecticut

Mr. Norman Wheeler
Tool & Die Instructor
Wilcox Technical School
Meriden, Connecticut

Mr. Edmund Skinger
Machine Shop Instructor
Norwich Technical School
Norwich, Connecticut

Appendix B

Procedure for Developing Occupational Competency Examinations

1. Define the occupation in terms of the Dictionary of Occupational Titles.

2. Identify the major content divisions (factors) of the occupation. Some of the major factors may be identified as specialty areas and not included as part of the basic examination.

3. Identify occupational topics (sub-factors) in outline form. One outline for the written examination and one for the performance examination. (Scopes of written and performance examination)

4. Assign percentage weights to each major factor on the scope of the written examination. The assigned weights for each factor are judgment decisions based on importance of the factor content within the occupation.

5. Write multiple-choice test items with a minimum of four options each. Sufficient items should be developed to make up a basic examination of approximately 200 items. The number of items written should correspond with the assigned percentage weights on the written examination scope. Specialty areas, if applicable, will involve additional items.

6. Review each test item for clarity of wording, correctness and importance of content and verification of the correct answer.

7. Assemble test selecting enough items to adequately sample the important content of the occupation with consideration of the assigned percentage weights for major factors. Assemble items to adequately sample the content of specialty areas if applicable.

8. Identify handbooks and other erference materials that the examinee will be permitted to use during the examination session.

9. Define directions for administration of the written examination. Establish an estimated time for examination administration.

10. Identify performance tasks that may be executed by the examinee for testing manipulative skills. The scope of the performance examination should be utilized.

11. Develop the performance examination tasks:

    a. Identify each task as an objective or job that is to be accomplished by the examinee. (Examinee instructions).

    b. Identify the tools, materials, machines, and all items needed to perform each task. (Examiner instructions).

    c. Design an objective rating scale for each task. The design of the scale may involve either or both process and product.

d. Identify the evaluation criteria and appropriate levels of performance.

12. Develop a sufficient number of tasks to representatively sample important aspects of the occupation. A performance examination involving several tasks which lasts 3-5 hours should be adequate.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR AUTOMOTIVE MECHANICS

MAJOR TRADE FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. ENGINE	20%	40
Lubrication system Cooling system Mechanical components		
2. FUEL AND EXHAUST SYSTEMS	15%	30
Principles of Carburetion Mechanical Components Emission controls Exhaust		
3. ELECTRICAL SYSTEMS	30%	60
Fundamentals of electricity Charging systems Battery and starting systems Ignition systems		
4. DRIVE TRAIN	15%	30
Transmissions Clutches Differentials Drive shafts		
5. FRONT AND REAR SUSPENSION	10%	20
Front end geometry Shock absorbers and springs Steering Tires		
6. BRAKES	10%	20
Principles of hydraulics Disc brakes Drum brakes Power brakes		
7. AIR CONDITIONING	(Specialty indicator)	20
Compressor Heat exchangers Valves and Piping Refrigerant Diagnostics and Service		

Examination consists of 220 multiple-choice test items.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR CARPENTRY

MAJOR OCCUPATIONAL FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. SHOP WORK	23%	48
Employment Opportunities Shop Safety Blueprint Reading Use and Conditioning Handtools Use of Machines Fastenings and Joinery Wood and Lumber Technology		
2. CONCRETE FORM WORK	13%	27
Excavation technology Footing technology Forms for Foundations Special forms Anchor bolts Concrete cure		
3. FRAMING	28%	60
Types of Framing Sills Floor Framing Wall and Partition Framing Types of Roofs Roof Framing		
4. EXTERIOR FINISH	19%	39
Sheathing Wall Covering Doors and Windows Roof Covering Cornice Louver Dormers		
5. INTERIOR FINISH	17%	36
Insulation Wall and Ceiling Covering Doors and Windows Floors Interior Trim Stairs		

Examination consists of 210 multiple-choice test items.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR CHEF

MAJOR OCCUPATIONAL FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. KITCHEN MANAGEMENT	10%	25
Personal Hygiene Food Sanitation Dishwashing Temperatures (Rinse and Wash) Food Service Occupations Menu Planning Culinary Terminology Purchasing, Receiving, Storing, and Issuing Food Costs and Control Weights and Measures		
2. SALAD PREPARATION, COLD PLATES, AND SANDWICHES	15%	38
Dressings Storage of Prepared Salads Appetizers, Canapes, Hors d'Oeuvres		
3. MEAT, FISH AND POULTRY	30%	75
Sauteed Braised Poached Broiled Baked Fried Cooking Times and Temperatures		
4. VEGETABLE AND STARCH COOKERY	15%	37
Preparation of Green Vegetables Preparation of Yellow Vegetables Preparation of White Vegetables Preparation of Red Vegetables Preparation of Potatoes Preparation of Rice Preparation of Macaroni Dried Legumes		
5. SAUCES	20%	50
Soups Soup Stocks Gravies		
6. DESSERTS AND BEVERAGES	10%	25
Basic Ingredients Pie Crusts Pie Fillings Cakes Puff Pastry Cream Puffs, Eclairs -		

Examination consists of 250 multiple-choice test items.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR RESIDENTIAL ELECTRICIAN

MAJOR OCCUPATIONAL FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. ELECTRICAL THEORY	35%	70
Atomic Theory		
Magnets		
Electro magnets		
Batteries		
Conductors		
Insulators		
Terminology: Volts, Amps, Ohms, Watts, Conductance, Frequency		
Ohms Law		
Series Circuit		
Parallel Circuit		
Power Formulas		
Kirchhoff's Law		
Efficiency		
Meters: Ohmmeter, Ammeter, Voltmeter, Megger, Wattmeter.		
Watt-hour Meter		
Inductance		
Capacitance		
Transformers		
2. INSTALLATIONS AND APPLICATIONS	65%	130
National Electrical Code - Single Family Dwellings (Based on Current Code)		
Services and Grounding		
Distribution: Feeders, Subfeeders, and Branch Circuits		
Sizing of Wires		
Load Calculations		
Electric Heating Systems		
A.C. Motors - Fractional Sizes		
Residential Motor Controls		
Material and Tool Terminology		
Overcurrent Protection		

Examination consists of 200 multiple-choice test items.

You may bring and use the following for the examination session:

National Electrical Code Handbook

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR INDUSTRIAL ELECTRONICS

MAJOR TRADE FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. ELECTRON PHYSICS AND MAGNETISM	15%	30
Electron Theory Nature of Matter Atomic Structure Laws of Charged Bodies Valence Electrons Conductors, Insulators, Semi-Conductors, Resistors Magnetic Fields Magnetic Materials Electro-Magnetism Magnetic Terms		
2. DIRECT CURRENT	20%	40
Electrical Units Meters Series Circuits Parallel Circuits Batteries Kirchhoff's Laws Ohm's Law Complex Circuits		
3. ALTERNATING CURRENT	25%	50
Sine Wave Time Constants R. L. Circuits R. C. Circuits R. C. L. Circuits Series Resonance Parallel Resonance Inductance Capacitance Transformers Filters		
4. CONTROL DEVICES	20%	40
Diodes - Solid State Transistors Silicon Control Rectifiers Tunnel Diode Unijunction Field Effect Diodes (Vacuum tubes) Triodes Pentodes Vacuum tubes		

(Industrial Electronics)

MAJOR FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
5. BASIC CIRCUITS	20%	40
Power Supplies Amplifiers Oscillators		
6. PULSE CIRCUITRY	(Specialty Indicator)	25
Gates Multivibrators Sync Pulses Nonsinosoidal Limiters Clippers Clampers Schmitt's Trigger		
7. COMMUNICATION	(Specialty Indicator)	30
Televisions Receivers Transmitters		

Examination consists of 255 multiple-choice test items.

You may bring and use the following items for the examination session:

Slide Rule
Electronics Handbook for reference tables and formulas.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR MACHINE DRAFTING

MAJOR TRADE FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. BASIC DRAFTING	40%	80
Instruments and Reproduction Equipment Applied Geometry Orthographic Drawing Auxiliary Drawing Sections and Conventions Pictorial Drawing Standard and Pipe Screw Threads		
2. WORKING DRAWINGS	20%	40
Dimensioning and Notes Tolerancing Fasteners Details and Assemblies		
3. POWER TRANSMISSION	20%	40
Hydraulics and Pneumatics Piping Gears Belt and Chain Drives Bearings Brakes, Clutches, and Couplings Mechanical Motions Keys, Pins, and Splines Springs		
4. MATERIALS AND PROCESSES	20%	40
Heat Treatment Material Selection Casting Plastics Machining Welding Structural Process Selection Forging		
5. TOOL DESIGN	(Specialty Indicator)	30
Jigs and Fixtures Dies Gages Cutting Tools		
6. ELECTRONICS	(Specialty Indicator)	20
Wiring Diagrams and Symbols		

Examination consists of 250 multiple-choice test items.

You may bring and use the following for the examination session:
Machinery's Handbook or similar engineering handbook.

Appendix C

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE WRITTEN EXAMINATION FOR MACHINE TRADES

MAJOR TRADE FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
1. GENERAL SHOP PRACTICE	20%	40
Drilling and Reaming Taps, Dies and Threading Cutting Tools Metal bandsawing Drill Press holding devices Lapping and Honing Assembly techniques Filing Broaching Safety Practices		
2. MEASUREMENTS AND INSPECTION	10%	20
Inspection Angular Measurement Linear Measurement Concentricity Measurement Squareness Measurement Flatness Measurement Hardness Measurement		
3. LATHE	10%	20
General Lathe practice Holding devices Tapers Threading and Boring Drilling and Reaming Speeds and Feeds calculations Safety Practices Turning Special applications (Knurling Cut-off)		
4. MILLING	25%	50
General Milling practice Holding devices Indexing Form milling Drilling, boring and reaming Speeds and Feeds calculations Safety practices Set-up techniques		

(Machine Trades)

MAJOR TRADE FACTORS AND SUBFACTORS	% of the Basic Exam	Number of Test Items
5. GRINDING	25%	50
Surface Grinding Cylinderical grinding (O.D. and I.D.) Tool and cutter grinding Wheel mounting and balancing Wheel selection Wheel dressing techniques Visual grinding Coolants Safety Practices		
6. METALS AND MATERIALS	10%	20
Characteristics of metals Characteristics of non-metallics (Plastic, Nylon, etc.) Machinability characteristics of metals Heat treatment processes Decarburization		
7. REMOTE CONTROLLED MACHINING	(Specialty indicator)	20
Electrical Discharge machining (EDM) Numerical Control (NC) Tracer Applications Duplicating techniques		
8. TOOL AND DIE MAKING	(Specialty indicator)	35
Piercing and blanking dies Forming dies Progressive dies Bending dies Drawing dies Jigs, fixtures and gages Jig boring and grinding Power Press		

Examination consists of 255 multiple-choice test items.

You may bring the following for the examination session:

Machinery's Handbook

Appendix D

Card Format for Writing Test Items

Occupation _____ Occupational Factor: _____

Code: ___E A D___ (difficulty) ___1 2 3 4___ (frequency of use) Subfactor: _____

Test Item Stem: _____

_____ _____

_____

Circle letter of correct answer

A. _____

B. _____

C. _____

D. _____

E. _____

Comments:

Sample Items - Automotive Mechanics Written Examination

1. When using an automotive oscilloscope, reversed polarity of the ignition system is indicated by:

   a. an upside down pattern
   b. the pattern reading from right to left.
   c. the pattern reading from left to right.
   d. the loss of vertical control.
   e. the loss of horizontal control.

2. The following condition would most likely be observed in a car with disc brakes having excessive disc runout:

   a. Excessive pedal pressure would be required in braking.
   b. The brake pedal would move rapidly in and out.
   c. The car would pull to one side.
   d. There would be rapid brake fade.
   e. The brakes would grab on one or more wheels.

3. To improve the cooling in a vehicle operated at low speed, the fan can be made to draw air through the total area of the radiator by:

   a. increasing the pitch of the fan blades.
   b. increasing the number of fan blades.
   c. using a smaller pulley to increase fan speed.
   d. installing a shroud on the back of the radiator.
   e. increasing radiator hose diameter.

4. In an automatic transmission, the speed at which an upshift is made is controlled by:

   a. spring tension in a shifter valve.
   b. the setting of the governor valve.
   c. release spring tension in the low band servo.
   d. accumulator piston setting.
   e. a compensator valve that increases servo pressure.

5. The most probable cause of excessive pressure in the high pressure side of an air conditioning system would be:

   a. an insufficient amount of refrigerant.
   b. an excessively high engine temperature.
   c. a by-pass valve which is stuck open.
   d. an insufficient amount of oil in the system.
   e. moisture in the system.

6. The dry compression reading of a cylinder is 80 lbs. By adding oil to this cylinder the compression increased to 120 lbs. What is the probable trouble in that cylinder?

   a. bad valve guides.
   b. bad valve guide seals.
   c. Valves adjusted too tight.
   d. Worn piston rings.
   e. Burnt valve.

Appendix E

Sample Items - Carpentry Written Examination

1. When reading blueprints, a view taken in the vertical plane is known as

   a. a detail drawing.
   b. a plan view.
   c. an elevation.
   d. a section drawing.

2. When assembling a large frame wall section on a horizontal surface, squareness can be determined most accurately by

   a. testing each corner with a framing square.
   b. using a plumb bob and a level to check the horizontal and vertical surfaces.
   c. measuring the lengths of the sides and the ends.
   d. comparing the diagonal measurements across opposite corners.

3. If the floor joists are to rest on top of the girder, then the top of the girder should

   a. be kept even with the top of the sill plate.
   b. be kept even with the foundation wall.
   c. be kept even with the top of the sill header.
   d. be level and true.

4. How much material would be required to cover a roof having 1/4 pitch on a house 24' wide by 48' long using asphalt strip shingles? Do not allow for cap or waste.

   a. 10 squares.
   b. 12 squares.
   c. 14 squares.
   d. 16 squares.

5. Butt hinges for hanging doors frequently have rounded corners to

   a. improve their appearance.
   b. reduce their cost by making them easier to manufacture.
   c. facilitate using a router to install them.
   d. increase their strength under stress.

6. A special problem presented by the post-and-beam construction techniques is the

   a. small roof span distance that may be used.
   b. installation of ceiling insulation.
   c. support requirements placed on beams.
   d. limitation placed on wall openings.

Appendix E

Sample Items - Chef Written Examination

1. An example of good consistency to be presented to guests as a combination is

   a. seafood Newburg in patty shell, creamed corn, mashed potatoes.
   b. broiled steak, mashed potatoes, broccoli.
   c. frankfurter, baked beans, lima beans.
   d. creamed chicken, steamed rice, harvard beets.

2. Why do some experts recommend tearing salad greens rather than cutting them?

   a. To avoid bruising them.
   b. Because it takes less time.
   c. Because the "experts" say so.
   d. To avoid a loss in flavor.

3. To differentiate between a sauce and a gravy we say

   a. a sauce is sweet and thick.
   b. a gravy is thin and has a meat base.
   c. a sauce always has wine in it.
   d. sauces are used to mask the flavor of the product.

4. To create more volume in a bakery product and add richness it is necessary to use

   a. eggs.
   b. shortening.
   c. baking powder.
   d. milk.

5. Not including shrinkage, how much ground beef would you need to prepare 50 portions of chopped beefsteak at 10 oz. each?

   a. 25 lbs. 10 oz.
   b. 37 lbs.
   c. 50 lbs.
   d. 100 lbs.

6. Ripe avocados turn dark when exposed to the air. This can be prevented by

   a. keeping covered with Saran wrap.
   b. cutting just before using.
   c. rubbing with lemon juice.
   d. cover with wet lettace leaves.

Sample Items - Residential Electrician Written Examination

1. A magnetic circuit breaker operates on the principle that

   a. an overload weakens the magnetic field.
   b. greater load increases the magnetic field.
   c. short circuits reduce the magnetic field.
   d. the heat will open the circuit.

2. For single family residences computed to have a load of 11 KW the ampacity of the service entrance conductors shall have an ampacity of not less than

   a. 30 amperes.
   b. 60 amperes.
   c. 100 amperes.
   d. 240 amperes.

3. An electric range operates on 220 volts. When four (4) surface units of equal size are turned to high, the total current is 36 amps. The wattage of each unit is

   a. 1632 watts.
   b. 1980 watts.
   c. 2200 watts.
   d. 7920 watts.

4. The purpose of the "heaters" on automatic controls is to

   a. keep the controls warm.
   b. provide heat to operate the overload devices.
   c. provide starting resistance for the motors.
   d. cut out the starting resistance to the motor.

5. If a motor is allowed to operate at depressed voltage for long periods of time, the result will be

   a. short circuit.
   b. open circuit.
   c. voltage dip.
   d. overheating.

6. As of January 1, 1973, residential occupancies having 120 volt single phase 15 and 20 amp. outdoor receptacles must have these receptacles protected by

   a. conduit.
   b. grounding.
   c. ground-fault circuit protection.
   d. low voltage circuit protection.

Appendix E

Sample Items - Industrial Electronics Written Examination

1. The electron density of a vacuum tube diode's space charge is based on

   a. cathode polarity.
   b. cathode temperature.
   c. plate polarity.
   d. cathode potential.
   e. plate temperature.

2. Assuming two resistors in series across a source of potential, if one of the resistors is shorted out the power dissipated in the remaining resistor will

   a. decrease.
   b. increase.
   c. remain the same.
   d. either decrease or increase depending on phase relationship.
   e. remain the same if the course of potential is in phase.

3. If the power output of an amplifier is decreased from a thousand watts to 10 watts, the power loss in db is

   a. 10 db.
   b. 20 db.
   c. 100 db.
   d. 1000 db.
   e. zero db.

4. In order to have a power factor of 1, that is, where true power is equal to apparent power in an A.C. circuit, inpedance must be

   a. pure inductive reactance.
   b. pure resistance.
   c. pure capacitive reactance.
   d. none of the above answers is correct.
   e. all of the above answers is correct.

5. The relationship between the power at the receiving antenna and the distance from the transmitting antenna is such that the power varies

   a. directly with distance.
   b. inversely with distance.
   c. directly with the square of the distance.
   d. inversely with the square of the distance.
   e. with none of the above.

6. When a sine wave of sufficient amplitude is placed in a saturable reactor circuit, the output waveform will be

   a. a sine wave.
   b. a peaky wave.
   c. a square wave.
   d. a sawtooth wave.
   e. a trapezoidal wave.

Sample Items - Machine Drafting Written Examination

1. In section drawing when a cutting plane passes entirely across the object, the result is

   a. a half section.
   b. an auxiliary section.
   c. a partial section.
   d. a center section.
   e. full section.

2. Your company manufactures toys in kit form requiring assembly by the consumer; what type of drawing would you recommend to be included with instruction sheet?

   a. orthographic
   b. sectional drawing
   c. exploded pictorial
   d. perspective
   e. block diagram.

3. A total amount by which a specific dimension may vary as the maximum or minimum on the part is a/an

   a. clearance
   b. transition
   c. line fit
   d. tolerance
   e. allowance

4. Hydraulic diagrams showing simple geometry figures and ANSI symbols are preferred by application and service engineers. These diagrams are called

   a. cutaway diagrams.
   b. pictorial diagrams.
   c. combination diagrams.
   d. graphical diagrams.
   e. block diagrams.

5. When a drawing of a wired assembly is required, it is usually prepared as a/an

   a. schematic assembly drawing.
   b. isometric assembly drawing.
   c. orthographic assembly drawing.
   d. oblique assembly drawing.
   e. any of these.

6. In jig and fixture design locating surfaces are decided by the

   a. previous operations.
   b. type of machine on which part will be made.
   c. type of material.
   d. size of the piece part.
   e. hardness of material.

Appendix E

Sample Items - Machine Trades Written Examination

1. The heating of steel considerably above the upper critical point results in a coarse grained steel. A coarse grained steel

   a. is tougher than fine grained steel.
   b. has more tendency to distort than fine grained steel.
   c. has a tendency to resist cracking during heat treatment.
   d. is more ductile than fine grained steel.

2. Which tool listed below could not have a vernier scale?

   a. Height gage.
   b. Bevel protractor.
   c. Micrometer caliper.
   d. Sliding scales caliper.
   e. Snap gage.

3. You have been asked to machine the teeth on a 34-tooth spur gear on the milling machine. The gear is 6" in diameter. Which of the following would be the correct dividing head crank movement to correctly machine the gear teeth?

   a. 34 crank turns and 6 holes in the 34-hole plate.
   b. 1 crank turn and 3 holes in the 34-hole plate.
   c. 1 crank turn and 3 holes in the 17-hole plate.
   d. 1 crank turn and 12 holes in the 36-hole plate.

4. When surface grinding work with a small surface exposed to the magnetic chuck, what precaution should be taken?

   a. Use a soft wheel.
   b. Use a hard wheel.
   c. Block it properly.
   d. Move table very slowly.
   e. Use a small wheel.

5. If a deep-draw die blank were to suddenly begin to draw a deeper blank, with no fractures, the probable cause is

   a. the spring pad pressure is too tight.
   b. the punch has gotten longer.
   c. that the lubricant has caused "air-forming" at the end of the blank.
   d. the stock has thinned out.
   e. the K.O. is descending too deep.

6. Which of the following is best for cutting small diameter radii on a bandsaw?

   a. Reduce tension on blade.
   b. Increase tension on blade.
   c. Use as wide a blade as the chart allows for that radii.
   d. Use as narrow a blade as can be obtained.
   e. No specific change in technique from general work need be made.

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE PERFORMANCE EXAMINATION FOR CHEF

1. PREPARE APPETIZERS (Two will be selected and prepared)

Chopped Chicken Liver
Baked Clam Casino
Deviled Eggs
Clam Chowder
Consomme Brunoise
Lobster Bisque
Minestrone
Crabmeat Cocktail
Shrimp Cocktail
Stuffed Celery
Consomme

2. PREPARE ENTREES (Three will be selected and prepared)

Swiss Steak Jardiniere
Veal Cordon Bleu with Tomato Sauce
Chicken Cacciatore
Beef Roulade
Stuffed Pork Chops with Sour Cream Gravy
Chicken Marengo
Chicken Maryland
Veal Scallopini
Broiled Stuffed Lobster
Seafood Newburg
Seafood Platter with Tartar Sauce
Braised Short Ribs Jardiniere
Chicken Tetrazinni
Chicken Livers Bercy
Baked Meat Loaf with Mushroom Sauce
London Broil Variations
Filet of Sole Meuniere
Poached Filet of Sole Mornay Glace

3. PREPARE VEGETABLES & STARCH PRODUCTS (Two vegetables and two starch products will be selected and prepared)

Corn Fritters
Risi Bisi
Peas Champignon
Broccoli Hollandaise
Cauliflower Polonaise
Green Beans Almondine
Peas Forestiere
Eggplant and Tomato Casserole
Rissole Potatoes
Baked Stuffed Potato
Rice Pilaf
O'Brien Potatoes

4. PREPARE SALADS & DRESSINGS (One salad and one dressing will be selected and prepared)

Marinated Cucumbers in Sour Cream
Candlestick Salad
Vinaigrette Dressing
Creamy French Dressing
Perfection Salad
Tossed Green Salad
Waldorf Salad
Chef's Salad
Mayonnaise
Basic French Dressing
Russian Dressing

5. PREPARE BAKED PRODUCTS (Two will be selected and prepared)

Chocolate Cream Pie
Blueberry Pie
Banana Cream Pie
French Apple Pie
Cream Puff
Chocolate Eclair

Parker House Rolls
Clover Leaf Rolls
Croissant Rolls
French Bread
Italian Bread
Corn Muffins

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

SCOPE OF THE PERFORMANCE EXAMINATION FOR RESIDENTIAL ELECTRICIAN

OCCUPATIONAL TASKS

* Install a service entrance

Install a remote control wiring system

* Install a lighting circuit with two 3-way and one 4-way switches

Cut in a wall case and install a receptacle

Install a door bell circuit

Install a wire mold application

Install two receptacles using a three-wire circuit

Install an annunciator

Install a three-way switch controlling a light and receptacle.

* Required of all examinees.

Appendix F

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Technical Education Department
New Britain, Connecticut

Scope of the Performance Examination for Machine Drafting

Basic Performance Tasks (Required of all examinees)	Exam Weight
Secondary auxilliary completion (Approximately 1/2 hour)	1/8
Intersection and development completion (Approximately 1/2 hour)	1/8
Detailing from an Assembly Drawing (Approximately 2 hours)	1/2
Specialty Performance Tasks (Examinees select one problem)	1/4

Fixture design problem
Die design problem
Machine design problem
Electronics schematic problem

(Completion time of each problem is approximately 3 hours)

Appendix G

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

CARPENTRY - PERFORMANCE/PRODUCT RATING CHECKLIST

CODE:
E - Exceptional
A - Acceptable
U - Unacceptable
D - Does Not Apply

Examiner: _____ Examinee: _____ Date: _____

TIME ALLOTTED: START TIME: FINISH:

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT				COMMENTS
1. SETTING OF SILL PLATE	E	A	U	D	
Diagonal check for squareness					
Parallel check for squareness					
3-4-5 check for squareness					
Use chalk line to establish sill plate location					
Procedure for marking and boring anchor bolts					
Condition of joints					
2. CONSTRUCTION OF DECK	E	A	U	D	
Layout of 1st double joist					
16" o.c. layout					
Check for sill header placement and nailing					
Bridging					
Placement of Crowns					
Use of Firestop					
3. CONSTRUCTION OF FRONT AND SIDE WALLS	E	A	U	D	
Placement of Joints on Sole Plate and Top Plate					
Layout of Door, Window, and Studs on Sole and Top Plate					
Use of pattern stud, and finding correct length for same off plan					
Correct rough opening size for a given size finish door					
Correct rough opening size for a specified window					
Neatness of fit at jack studs					
Assembly of window sill					
Nailing at the sole plate, top plate, header, studs, and jack studs (splitting, size, placement, etc.)					
Double top plate and lap at corner					
Installation of sheathing (before or after erection					
Plumbing procedure (use of given straight edge or not)					
Straighten to a line					
Bracing of walls (placement of brace of block on floor, and nailing of all)					
Construction of 3-piece corner post					
4. CONSTRUCTION OF GABLE ROOF	E	A	U	D	
Method of finding rafter lengths and cuts					
Layout of rafters at plate and ridge					
Accuracy and cuts of pattern rafter					
Sequence and placement of rafter nailing					
Placement of crowns on rafters					
Layout of rafter tail for overhand					
Plumb end of ridge with building and bracing of same					
5. CONSTRUCTION OF BOX CORNICE	E	A	U	D	
Check rafter tails for alignment					
Neatness of joints and straightness					
Fit at intersection of roof and fascia board					
Nailing					
Reveal					
Drip Edge (Wood Shingles)					
6. INSTALLATION OF EXTERIOR SIDING	E	A	U	D	
Layout					
Starting method at foundation					
Placement of joints					
Nailing and exposure					
Neatness of fits					

SUMMARIZED RATING: (Check one) HIGH PASS_____ PASS_____ MARGINAL PASS_____ NO PASS_____

Appendix G

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

CHEF - PERFORMANCE EXAM

PERFORMANCE/PRODUCT RATING CHECKLIST

CODE
E - Exceptional
A - Acceptable
U - Unacceptable
D - Does Not Apply

Examiner _____ Examinee _____ DATE _____

TIME ALLOTTED: START TIME: FINISH:

EVALUATION CRITERIA * Must rate acceptable or better	QUALITY OF PERFORMANCE OR PRODUCT E	A	U	D	COMMENTS
1. PREPARING AN APPETIZER	1 2	1 2	1 2	1 2	
Use of Recipes					
Planning & Organization					
* Overall Appearance of Product					
* Palatability					
Use of Tools & Equipment					
Use of Stocks & Bases					
Personal Sanitation					
Cleanliness of Work Area					
Proper Holding & Storage					
Safety Practices					
2. PREPARING ENTRIES	1 2 3	1 2 3	1 2 3	1 2 3	
Use of Recipes					
Planning & Organization					
* Overall Appearance of Product					
* Palatability					
Proper Usage of Herbs & Spices					
Use of Tools & Equipment					
Preparation of Sauces & Gravies					
Method of Cooking					
Cleanliness of Work Area					
Proper Holding & Storage					
Personal Sanitation					
Safety Practices					
3. PREPARING VEGETABLES & STARCH PRODUCTS	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	
Use of Recipes					
Planning & Organization					
* Overall Appearance					
Use of Tools & Equipment					
* Palatability					
Cleanliness of Work Area					
Personal Sanitation					
Proper Holding & Storage					
Safety Practices					
Method of Cooking					
4. PREPARING SALADS & DRESSINGS	1 2	1 2	1 2	1 2	
Use of Recipes					
Planning & Organization					
* Artistic Arrangement					
Base, Body, Dressing, Garnish					
Use of Tools & Equipment					
* Palatability					
Cleanliness of Work Area					
Personal Sanitation					
Proper Holding & Storage					
Preparation of Greens					
Safety Practices					
5. BAKERY PRODUCTS	1 2	1 2	1 2	1 2	
Use of Recipes					
Planning & Organization					
Use of Weights & Measures					
Proper Holding & Storage					
Cleanliness of Work Area					
* Palatability					
* Decoration					
Personal Sanitation					
Preparation of Pastries & Doughs					
Safety Practices					

SUMMARIZED RATING (Check One)

High Pass _____ Pass _____ Marginal Pass _____ No Pass _____

CODE:
E - Exceptional
S - Satisfactory
M - Marginal
U - Unacceptable

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

RESIDENTIAL EIECTRICIAN - PERFORMANCE/PRODUCT RATING CHECKLIST

Examiner:_____ Examinee:_____ Date:_____

JOB NO. 1: Install a two or three station remote control wiring system.

Time Allotted: 90 minutes START TIME:_____ FINISH TIME:_____

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT			
1. INSTALLING BOXES	E	S	M	U
Mounting				
Appearance				
2. INSTALLING TRANSFORMER & RELAY	E	S	M	U
Mounting				
Wiring				
Appearance				
3. WIRING				
Connections				
Corrections				
Operation				

SUMMARIZED RATING FOR THIS JOB: (check one)

High Pass_____ Pass_____ Marginal Pass_____ No Pass_____

Appendix G

CODE:
E - Exceptional
S - Satisfactory
M - Marginal
U - Unacceptable

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

RESIDENTIAL ELECTRICIAN - PERFORMANCE/PRODUCT RATING CHECKLIST

Examiner:_____ Examinee:_____ Date:_____

JOB NO. 2: Install an annunciator.

Time Allotted: 90 minutes START TIME:_____ FINISH TIME:_____

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT			
	E	S	M	U
1. INSTALLING BOXES				
Mounting				
Appearance				
2. INSTALLING TRANSFORMER & RELAY				
Mounting				
Wiring				
Appearance				
3. WIRING				
Connections				
Corrections				
Operation				

SUMMARIZED RATING FOR THIS JOB: (Check one)

High Pass_____ Pass_____ Marginal Pass_____ No Pass_____

Notations/Comments regarding Examinee Performance:

Appendix G

CODE:
E - Exceptional
S - Satisfactory
M - Marginal
U - Unacceptable

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

RESIDENTIAL ELECTRICIAN - PERFORMANCE/PRODUCT RATING CHECKLIST

Examiner:_____ Examinee:_____ Date:_____

JOB NO. 3: Install a three-way switch controlling a light and receptacle.

Time Allotted: 60 minutes START TIME:_____ FINISH TIME:_____

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT			
1. INSTALLING BOXES	E	S	M	U
Mounting				
Appearance				
2. WIRING	E	S	M	U
Connections				
Correctness				
Operation				

SUMMARIZED RATING FOR THIS JOB: (check one)

High Pass_____ Pass_____ Marginal Pass_____ No Pass_____

Notations/Comments regarding Examinee Performance:

Appendix G

CODE:
E - Exceptional
S - Satisfactory
M - Marginal
U - Unacceptable

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

RESIDENTIAL ELECTRICIAN - PERFORMANCE/PRODUCT RATING CHECKLIST

Examiner:_____ Examinee:_____ Date:_____

JOB NO. 4: Install a service entrance.

Time Allotted: 2 hours START TIME:_____ FINISH TIME:_____

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT			
1. METER SOCKET	E	S	M	U
Mounting Height				
Appearance				
Connections				
2. CONDUIT	E	S	M	U
Cutting-Threading-Binding				
Mounting				
Fittings				
3. PANEL	E	S	M	U
Mounting				
Connections				
Grounding				
4. WIRING	E	S	M	U
Connections				
Correctness				

SUMMARIZED RATING FOR THIS JOB: (check one)

High Pass_____ Pass_____ Marginal Pass_____ No Pass_____

Notations/Comments regarding Examinee Performance:

CODE:
E - Exceptional
S - Satisfactory
M - Marginal
U - Unacceptable

CENTRAL CONNECTICUT STATE COLLEGE
Vocational Industrial Technical Education Department
New Britain, Connecticut

RESIDENTIAL ELECTRICIAN - PERFORMANCE/PRODUCT RATING CHECKLIST

Examiner:_____ Examinee:_____ Date:_____

JOB NOS. 5 & 6: Install a door bell circuit (2 or 4 push buttons).

Time Allotted: 45 minutes START TIME:_____ FINISH TIME:_____

EVALUATION CRITERIA	QUALITY OF PERFORMANCE OR PRODUCT			
1. INSTALLING COMPONENTS	E	S	M	U
Mounting				
Appearance				
2. WIRING	E	S	M	U
Connections				
Correctness				
Operation				

SUMMARIZED RATING FOR THIS JOB: (check one)

High Pass_____ Pass_____ Marginal Pass_____ No Pass_____

Notations/Comments regarding Examinee Performance:

STATE OF CONNECTICUT
CENTRAL CONNECTICUT STATE COLLEGE
1615 STANLEY STREET — NEW BRITAIN, CONNECTICUT 06050

AREA CODE 203
225-7481

January 17, 1973

Dear Sir:

There is a national trend to test potential vocational school trade instructors for occupational competency before they enter the teaching profession. Connecticut's Bureau of Vocational Technical Schools subscribes to this viewpoint and is starting such a testing program.

The Bureau is in the process of updating its files of potential trade instructors and your application for employment as a trade instructor is in the Bureau's file. You are therefore requested to complete a written examination for your trade area to maintain your application in the active file. If you choose not to complete the examination, your application will be placed in an inactive file and we will assume you are no longer interested in a trade teachers position in Connecticut's Vocational Technical Schools.

The written examination for your trade area is administered free of charge and will require about three hours to complete. Central Connecticut State College is working cooperatively with the Bureau of Vocational Technical Schools in the administration of the examination.

The examination procedure requires that test performance standards be established. Test scores of fifty people completing the examination for your trade area will be selected in establishing this test standard. Each of the 50 people selected will be paid ten dollars ($10.00) for their participation in establishing the test standard.

If you are still interested in trade teaching, we urge you to complete the enclosed application. A self-addressed envelope is enclosed for returning it to the proper office. The application must be received by February 2, 1973 so that we may meet on the scheduled test date.

Sincerely,

Frederic G. Okula

Frederic G. Okula, Consultant
Trade and Industrial Education
State Department of Education

STATE OF CONNECTICUT
CENTRAL CONNECTICUT STATE COLLEGE
1615 STANLEY STREET — NEW BRITAIN, CONNECTICUT 06050

AREA CODE 203
225-7481

Dear Sir:

There is a national trend to test potential vocational school trade instructors for occupational competency before they enter the teaching profession. Connecticut's Bureau of Vocational Technical Schools subscribes to this viewpoint and is supporting such a testing program. A part of this program involves the development of several examinations for various occupational areas.

A written examination for your trade area has been prepared and is ready for administration. We are seeking 50 people from your trade area to take this examination to establish standards of test performance. The only requirement to participate is that you have 8 or more years of current experience in your occupation. Each of the 50 people selected will be paid ten dollars ($10.00) for their participation in establishing this standard of test performance.

The examination will require about three hours to complete. An outline of topics covered in the examination is enclosed for your information. Dates and locations of examination administration are listed on the enclosed registration form.

Your assistance in the development of this trade teacher examination program will be very much appreciated. You may register for this examination by completing the enclosed application. A self-addressed envelope is also enclosed for returning it to the proper office. We urge you to return the application as soon as possible so that we may meet on the scheduled test dates.

Sincerely,

Raymond J. Ross, Assoc. Professor
Division of Technology

RJR/aaw
Encls:

Appendix I

OCCUPATIONAL COMPETENCY EXAMINATIONS

Registration Form

Return to:

Dr. Raymond J. Ross
Division of Technology
Central Connecticut State College
New Britain, Connecticut 06050

NOTE: THIS APPLICATION MUST BE RETURNED BY FEBRUARY 2, 1973.

Your Name _____ Date _____

Mailing Address _____
Street City State Zip

Telephone: Home _____ Business _____

Your Occupation _____ No. Years Experience _____

Do you hold an occupational license? _____ Yes _____ No

If Yes, Issued by whom? _____ (State) Date of issue _____ (Year)

Name of Company where you work _____

Company Location _____
City State

Your examination will be administered at the locations and dates shown below. Indicate one location and date you will appear to take the examination.

Check one date only:

Norwich Technical School, 590 New London Turnpike, Norwich, Conn.

_____ Monday March 5, 1973 6:45 - 10:00 P.M.

_____ Wednesday March 7, 1973 6:45 - 10:00 P.M.

E. C. Goodwin Technical School, 735 Slater Road, New Britain, Conn.

_____ Monday March 12, 1973 6:45 - 10:00 P.M.

_____ Thursday March 15, 1973 6:45 - 10:00 P.M.

W. F. Kaynor Technical School, 43 Tompkins Street, Waterbury, Conn.

_____ Monday March 19, 1973 6:45 - 10:00 P.M.

_____ Wednesday March 21, 1973 6:45 - 10:00 P.M.

Enclosed is an outline of the written examination for your trade area. Please keep the outline for your information.

Appendix J

Normative Scores for Automotive Mechanics Written Examination

Engine (Section 1)		Fuel & Exhaust Systems (Section 2)		Electrical Systems (Section 3)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
35	99	26	97	49	99
34	95	25	89	48	96
33	89	24	80	47	93
32	81	23	72	46	92
31	72	22	59	45	92
30	57	21	46	44	91
29	46	20	36	43	88
28	39	19	28	42	84
27	27	18	19	41	81
26	18	17	14	40	80
25	14	16	11	39	77
24	14	15	5	38	76
23	11	14	1	37	74
22	5			36	69
21	1			35	62
20	1			34	61
19	1			33	57
18	1			32	54
17	1			31	53
				30	49
				29	42
				28	35
				27	32
				26	31
				25	26
				24	20
				23	18
				22	14
				21	9
				20	7
				19	5
				18	5
				17	5
				16	5
				15	4
				14	3
				13	3
				12	1

Appendix J

Normative Scores for Automotive Mechanics Written Examination - Continued

Drive Train (Section 4)

Raw Score	Percentile Rank
26	97
25	94
24	92
23	85
22	78
21	72
20	65
19	51
18	33
17	22
16	18
15	15
14	13
13	11
12	8
11	3

Front & Rear Suspension (Section 5)

Raw Score	Percentile Rank
16	96
15	86
14	71
13	56
12	44
11	31
10	18
9	10
8	6
7	3

Brakes (Section 6)

Raw Score	Percentile Rank
16	97
15	89
14	72
13	54
12	38
11	21
10	11
9	7
8	6
7	4
6	3
5	3
4	3
3	1

Air Conditioning (Specialty)

Raw Score	Percentile Rank
16	98
15	94
14	87
13	81
12	75
11	63
10	54
9	44
8	33
7	25
6	15
5	6
4	2

Appendix J

Normative Scores for Automotive Mechanics Written Examination

Basic Examination

(Composite of Sections 1,2,3,4,5,6)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
161	98	125	47
160	97	124	46
159	96	123	44
158	94	122	44
157	94	121	43
156	93	120	42
155	91	119	40
154	91	118	39
153	90	117	39
152	89	116	37
151	89	115	36
150	89	114	33
149	89	113	29
148	89	112	26
147	89	111	25
146	89	110	25
145	89	109	25
144	89	108	22
143	86	107	19
142	83	106	19
141	80	105	18
140	78	104	18
139	76	103	15
138	75	102	14
137	75	101	14
136	75	100	14
135	73	99	11
134	71	98	7
133	66	97	4
132	62	96	3
131	58	95	3
130	54	94	3
129	53	93	3
128	50	92	3
127	47	91	3
126	47	90	1

Appendix J

Normative Scores for Carpentry Written Examination

Shop Work (Section 1)

Raw Score	Percentile Rank
43	98
42	96
41	96
40	90
39	81
38	73
37	60
36	46
35	33
34	27
33	21
32	17
31	15
30	10
29	8
28	6
27	4
26	4
25	4
24	4
23	2

Concrete Form Work (Section 2)

Raw Score	Percentile Rank
27	96
26	88
25	77
24	56
23	40
22	33
21	23
20	13
19	4

Framing (Section 3)

Raw Score	Percentile Rank
51	98
50	96
49	94
48	88
47	75
46	65
45	56
44	44
43	29
42	21
41	21
40	17
39	13
38	10
37	8
36	8
35	8
34	8
33	6
32	4
31	4
30	4
29	4
28	4
27	2

Exterior Finish (Section 4)

Raw Score	Percentile Rank
38	96
37	92
36	90
35	83
34	77
33	71
32	58
31	42
30	31
29	25
28	19
27	13
26	8
25	6
24	2

Interior Finish (Section 5)

Raw Score	Percentile Rank
35	96
34	88
33	83
32	79
31	67
30	50
29	40
28	35
27	31
26	27
25	23
24	15
23	8
22	8
21	6
20	4
19	4
18	4
17	4
16	4
14	2

Appendix J

Normative Scores for Carpentry Written Examination

Basic Examination
(Composite of Sections 1,2,3,4,5)

Raw Score	Percentile Rank
186	98
185	96
184	94
183	92
182	92
181	92
180	88
179	83
178	81
177	77
176	75
175	75
174	75
173	75
172	60
171	54
170	54
169	54
168	54
167	54
165	54
165	50
163	46
162	44
161	42
160	42
159	42
158	38
157	33
156	33
155	33
154	33
153	33
152	33
151	29
150	23
149	21
148	21
147	19
146	17
145	17
144	17
143	17
142	15
141	13
140	13
139	10
138	8
137	8
136	8
135	6
134	4
133	4
132	4
131	4
130	2

Appendix J

Normative Scores for Chef Written Examination

Kitchen Management (Section 1)		Salads, Cold Plates & Sandwiches (Section 2)		Meat, Fish & Poultry (Section 3)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
23	96	33	96	58	96
22	88	32	88	57	92
21	79	31	83	56	92
20	67	30	75	55	79
19	54	29	63	54	63
18	50	28	58	53	58
17	42	27	54	52	58
16	29	26	46	51	54
15	13	25	42	50	50
		24	33	49	50
		23	25	48	50
		22	17	47	50
		21	8	46	46
		20	8	45	42
		19	8	44	38
		18	8	43	29
		17	8	42	25
		16	8	41	17
		15	8	40	8
		14	8	39	8
		13	4	38	8
				37	8
				36	4

Normative Scores for Chef Written Examination - Continued

Vegetable & Starch Cookery (Section 4)

Raw Score	Percentile Rank
30	96
29	88
28	79
27	71
26	63
25	54
24	38
23	25
22	25
21	17
20	4

Sauces (Section 5)

Raw Score	Percentile Rank
45	96
44	92
43	92
42	92
41	92
40	92
39	92
38	79
37	67
36	67
35	58
34	50
33	46
32	42
31	38
30	33
29	33
28	29
27	17
26	8
25	8
24	8
23	4

Desserts & Beverages (Section 6)

Raw Score	Percentile Rank
20	96
19	92
18	83
17	63
16	42
15	29
14	21
13	13
12	4

Appendix J

Normative Scores for Chef Written Examination

Basic Examination

(Composite of Sections 1,2,3,4,5,6)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
204	96	169	58
203	92	168	58
202	92	167	58
201	92	166	58
200	92	165	58
199	92	164	58
198	92	163	58
197	92	162	58
196	92	161	58
195	92	160	54
194	92	159	50
193	92	158	50
192	92	157	50
191	92	156	46
190	92	155	42
189	87	154	42
188	83	153	33
187	83	152	25
186	79	151	21
185	75	150	17
184	75	149	17
183	71	148	17
182	67	147	17
181	67	146	17
180	67	145	17
179	67	144	17
178	67	143	17
177	67	142	17
176	67	141	12
175	67	140	8
174	67	139	8
173	62	138	8
172	58	137	8
171	58	136	4
170	58		

Normative Scores for Electrician (Residential) Written Examination

Electrical Theory (Section 1)		Installations & Applications (Section 2)	
Raw Scores	Percentile Rank	Raw Scores	Percentile Rank
66	94	92	94
65	88	91	88
64	88	90	88
63	81	89	88
62	69	88	88
61	63	87	88
60	63	86	81
59	63	85	75
58	63	84	75
57	63	83	75
56	63	82	75
55	63	81	75
54	63	80	75
53	63	79	75
52	56	78	75
51	44	77	75
50	31	76	69
49	19	75	63
48	13	74	63
47	13	73	63
46	13	72	63
45	13	71	56
44	6	70	50
		69	50
		68	44
		67	38
		66	38
		65	38
		64	38
		63	31
		62	25
		61	25
		60	25
		59	25
		58	25
		57	25
		56	25
		55	25
		54	25
		53	25
		52	13

Appendix J

Normative Scores for Electrician (Residential) Written Examination

Basic Examination

(Composite of Sections 1 & 2)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
158	94	129	63
157	88	128	56
156	88	127	50
155	88	126	50
154	88	125	44
153	88	124	38
152	88	123	38
151	88	122	31
150	88	121	25
149	88	120	25
148	88	119	25
147	88	118	25
146	88	117	25
145	88	116	25
144	88	115	25
143	88	114	25
142	88	113	25
141	88	112	25
140	88	111	25
139	88	110	25
138	88	109	25
137	88	108	25
136	88	107	25
135	88	106	25
134	88	105	25
133	88	104	25
132	88	103	25
131	81	102	19
130	69	101	6

Appendix J

Normative Scores for Industrial Electronics Written Examination

Electron Physics & Magnetism (Section 1)		Direct Current (Section 2)		Alternating Current (Section 3)	
Raw Score	Percenitle Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
28	96	38	99	48	99
27	88	37	87	47	96
26	79	36	75	46	94
25	70	35	64	45	90
24	64	34	48	44	84
23	60	33	36	43	79
22	55	32	30	42	74
21	46	31	26	41	67
20	38	30	24	40	62
19	32	29	23	39	56
18	24	28	21	38	50
17	14	27	19	37	46
16	6	26	15	36	43
15	2	25	12	35	41
14	2	24	10	34	37
13	2	23	10	33	30
12	2	22	8	32	27
11	2	21	7	31	23
10	2	20	6	30	21
9	2	19	5	29	20
8	1	18	4	28	20
		17	2	27	20
		16	2	26	20
		15	2	25	17
		14	2	24	12
		13	2	23	10
		12	2	22	9
		11	1	21	6
				20	5
				19	5
				18	4
				17	2
				16	2
				15	1

Appendix J

Normative Scores for Industrial Electronics Written Examination - Continued

Control Devices (Section 4)		Basic Circuits (Section 5)		Pulse Circuitry (Specialty)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
33	96	36	99	23	99
32	91	35	96	22	97
31	89	34	95	21	95
30	85	33	94	20	89
29	79	32	90	19	84
28	73	31	85	18	80
27	64	30	78	17	73
26	54	29	72	16	66
25	48	28	66	15	62
24	44	27	60	14	57
23	38	26	57	13	47
22	40	25	51	12	38
21	32	24	45	11	31
20	32	23	43	10	22
19	20	22	39	9	16
18	18	21	35	8	15
17	16	20	30	7	12
16	15	19	24	6	9
15	11	18	22	5	8
14	6	17	22	4	7
13	5	16	18	3	5
12	5	15	15	2	3
11	4	14	13		
10	2	13	12		
9	1	12	8		
		11	5		
		10	4		
		9	2		
		8	1		

Appendix J

Normative Scores for Industrial Electronics Written Examination - Continued

Communication
(Specialty)

Raw Score	Percentile Rank
27	99
26	94
25	88
24	78
23	71
22	67
21	61
20	57
19	53
18	44
17	38
16	35
15	33
14	31
13	26
12	25
11	22
10	19
9	15
8	10
7	8
6	7
5	6
4	6
3	3

Appendix J

Normative Scores for Industrial Electronics Written Examination

Basic Examination

(Composite of Sections 1,2,3,4,5)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
179	99	129	33
178	98	128	33
177	98	127	33
176	98	126	31
175	96	125	30
174	95	124	29
173	94	123	28
172	93	122	26
171	93	121	25
170	93	120	25
169	93	119	24
168	93	118	23
167	89	117	23
166	85	116	23
165	85	115	23
164	85	114	23
163	85	113	21
162	84	112	20
161	83	111	20
160	80	110	19
159	75	109	18
158	73	108	16
157	70	107	15
156	66	106	15
155	65	105	15
154	65	104	15
153	64	103	15
152	61	102	15
151	58	101	15
150	55	100	14
149	54	99	13
148	51	98	13
146	50	97	11
145	49	96	10
144	46	95	10
143	44	94	9
142	43	93	8
141	43	92	8
140	41	91	6
139	40	90	5
138	40	89	5
137	40	88	5
136	40	87	5
135	39	86	4
134	36	85	3
133	34	84	3
132	33	83	3
131	33	82	3
130	33	81	1

Appendix J

Normative Scores for Machine Drafting Written Examination

Basic Drafting (Section 1)		Working Drawings (Section 2)		Power Transmissions (Section 3)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
73	99	32	98	33	99
72	98	31	97	32	97
71	98	30	95	31	93
70	98	29	92	30	90
69	96	28	85	29	86
68	92	27	77	28	83
67	91	26	68	27	81
66	88	25	57	26	78
65	86	24	47	25	72
64	82	23	39	24	64
63	79	22	33	23	59
62	78	21	27	22	53
61	75	20	19	21	44
60	73	19	14	20	34
59	69	18	10	19	28
58	62	17	7	18	25
57	58	16	4	17	19
56	55	15	3	16	11
55	52	14	1	15	9
54	47			14	8
53	41			13	7
52	36			12	7
51	32			11	6
50	29			10	5
49	25			9	4
48	23			8	3
47	22			7	2
46	20				
45	16				
44	13				
43	11				
42	10				
41	9				
40	7				
39	4				
38	3				
37	2				

Appendix J

Normative Scores for Machine Drafting Written Examination - Continued

Materials & Processes (Section 4)		Electronics (Specialty)		Tool Design (Specialty)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
32	99	16	99	26	99
31	98	15	96	25	97
30	97	14	91	24	94
29	96	13	84	23	88
28	93	12	77	22	80
27	87	11	68	21	72
26	79	10	56	20	65
25	71	9	43	19	60
24	61	8	32	18	57
23	53	7	26	17	51
22	46	6	20	16	44
21	40	5	14	15	41
20	35	4	11	14	35
19	30	3	9	13	30
18	24	2	8	12	24
17	16	1	3	11	14
16	10			10	8
15	9			9	7
14	8			8	5
13	6			7	3
12	5			6	1
11	4				
10	3				
9	3				
8	3				
7	1				

Appendix J

Normative Scores for Machine Drafting Written Examination

Basic Examination

(Composite of Sections 1,2,3,4)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
154	99	116	36
153	98	115	36
152	98	114	36
151	98	113	36
150	95	112	34
149	93	111	31
148	90	110	30
147	87	109	30
146	87	108	29
145	86	107	28
144	85	106	26
143	85	105	25
142	85	104	25
141	85	103	23
140	83	102	20
139	80	101	18
138	77	100	17
137	76	99	12
136	74	98	12
135	73	97	12
134	72	96	11
133	70	95	11
132	69	94	10
131	69	93	7
130	65	92	5
129	62	91	5
128	62	90	5
127	61	89	5
126	59	88	5
125	56	87	5
124	53	86	4
123	46	85	4
122	43	84	4
121	43	83	4
120	42	82	3
119	41	81	2
118	40	80	2
117	38	79	1

Appendix J

Normative Scores for Machine Trades Written Examination

General Shop Practice (Section 1)

Raw Score	Percentile Rank
37	99
36	99
35	98
34	95
33	92
32	90
31	85
30	76
29	64
28	49
27	38
26	29
25	24
24	18
23	13
22	8
21	3
20	3
19	2
18	1

Measurements & Inspection (Section 2)

Raw Score	Percentile Rank
20	99
19	96
18	85
17	71
16	53
15	35
14	23
13	12
12	6
11	3
10	1

Lathe (Section 3)

Raw Score	Percentile Rank
20	97
19	86
18	68
17	47
16	29
15	18
14	11
13	6
12	2
11	1
10	1
9	1

Milling (Section 4)

Raw Score	Percenitle Rank
44	99
43	99
42	97
41	92
40	83
39	73
38	62
37	51
36	40
35	30
34	25
33	21
32	16
31	11
30	7
29	5
28	5
27	3
26	3
25	3
24	3
23	3
22	2
21	1
20	1
19	1
18	1
17	1
16	1

Grinding (Section 5)

Raw Score	Percentile Rank
43	99
42	97
41	95
40	90
39	84
38	79
37	72
36	64
35	57
34	51
33	47
32	40
31	29
30	20
29	17
28	14
27	10
26	8
25	6
24	5
23	3
22	2
21	1
20	1
19	1
18	1
17	1

Appendix J

Normative Scores for Machine Trades Written Examination - Continued

Metals & Materials (Section 6)		Remote Controlled Machining (Specialty)		Tool & Die Making (Specialty)	
Raw Score	Percentile Rank	Raw Score	Percentile Rank	Raw Score	Percentile Rank
19	99	14	96	26	99
18	94	13	87	25	98
17	91	12	76	24	97
16	83	11	66	23	96
15	71	10	55	22	95
14	58	9	45	21	91
13	46	8	36	20	82
12	39	7	25	19	74
11	31	6	17	18	68
10	19	5	13	17	60
9	10	4	9	16	51
8	4	3	7	15	40
7	1	2	4	14	33
		1	1	13	29
				12	23
				11	17
				10	15
				9	13
				8	11
				7	8
				6	6
				5	6
				4	5
				3	4
				2	4
				1	2

Appendix J

Normative Scores for Machine Trades Written Examination

Basic Examination

(Composite of Sections 1,2,3,4,5,6)

Raw Score	Percentile Rank	Raw Score	Percentile Rank
171	99	134	28
170	98	133	25
169	97	132	24
168	97	131	24
167	97	130	22
166	95	129	20
165	92	128	19
164	90	127	18
163	88	126	17
162	86	125	14
161	85	124	12
160	84	123	11
159	83	122	10
158	82	121	9
157	80	120	8
156	78	119	7
155	75	118	7
154	71	117	7
153	71	116	7
152	71	115	7
151	68	114	7
150	64	113	7
149	61	112	6
148	59	111	5
147	58	110	5
146	56	109	4
145	53	108	3
144	49	107	3
143	48	106	3
142	45	105	2
141	41	104	1
140	40	103	1
139	38	102	1
138	35	101	1
137	34	100	1
136	34	99	1
135	32	98	1

STATE OF CONNECTICUT
CENTRAL CONNECTICUT STATE COLLEGE
1615 STANLEY STREET — NEW BRITAIN, CONNECTICUT 06050

AREA CODE 203
225-7481

May 25,1973

TO: Participants of Occupational Competency Examinations

FROM: Dr. Raymond J. Ross
Vocational-Technical Education Department

The enclosed report shows the scores you made on the written examination for your occupational area. Two copies of these scores were made. One copy is for you and the second copy is attached to your application for employment as a trade instructor in the files of the Connecticut Bureau of Vocational Technical Schools. The original copy of your scores will be kept on file at Central Connecticut State College, Vocational-Technical Education Department.

Thank you for your cooperation in this occupational examination project. Since your scores were used in establishing a test standard for your occupational area, enclosed is a $10.00 honorarium in thanks for your participation.

CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

Exam Title Automotive Mechanics No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 Engine	Section 2 Fuel & Exhaust Systems	Section 3 Electrical Systems	Section 4 Drive Train	Section 5 Front and Rear Suspension	Section 6 Brakes	Section 7 Air-Conditioning (Specialty)	Section 8	Composite Sections 1, 2, 3, 4, 5, 6.
Raw Score									
Percentile Rank									

FILLING YOUR OCCUPATIONAL COMPETENCY PROFILE

The numbers that tell you how you did on each section of the examination are in the row marked "Percentile Rank". Your percentile tells you where you rank on an examination section in comparison with other tradesmen in your occupation. These percentiles are based on examination scores earned by Connecticut tradesmen in your occupational field. If your percentile rank is 50, you are just in the middle - that is, one-half of the tradesmen in the group did better than you and one-half did less well.

Your overall performance on this examination is shown in the column marked "Composite". The composite involves combining your scores for several sections of the examination. It gives you a measure expressed in percentile rank of how you did overall on the occupational examination.

In the column below each percentile rank is drawn your occupational competency profile. For each section of the examination a heavy short line is drawn across the column at the level which corresponds to your percentile rank. The profile graphically shows the strength of your tested occupational competencies.

Think of "percentile" as meaning "percent of people". In your case, the people are tradesmen from Connecticut in your occupation. The percentile shows what percent of the group completing this examination scored no higher than you did. If your percentile rank on one section is 80, you are at the top of 80 percent of the group - only 20 percent made higher scores than yours. If you scored in the 25th percentile, this would mean about 75 percent of the group did better than you on the examination. Thus, a percentile rank always is your relative position within the group. It does not tell how many questions (or what percent of them) you answered correctly.

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CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

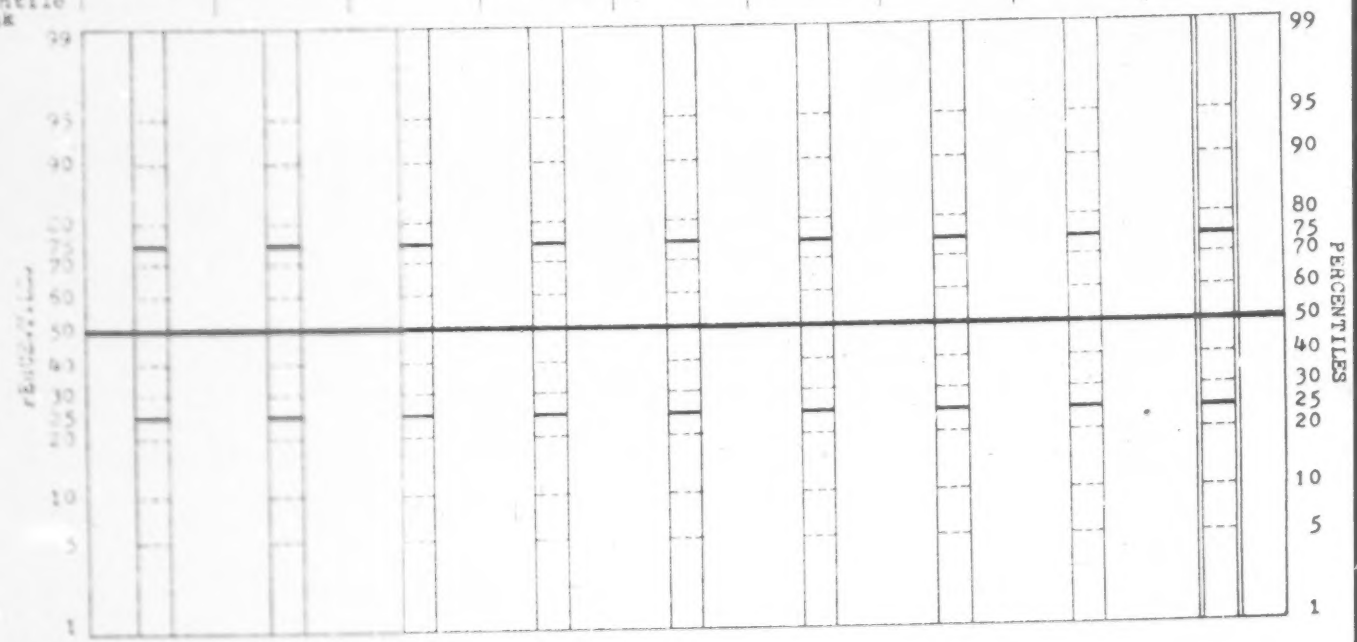
Exam Title Carpentry No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Composite Sections
	Shop Work	Concrete Form Work	Framing	Exterior Finish	Interior Finish				1, 2, 3, 4, 5.
Raw Score									
Percentile Rank									



PROFILING YOUR OCCUPATIONAL COMPETENCY SCORES

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CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

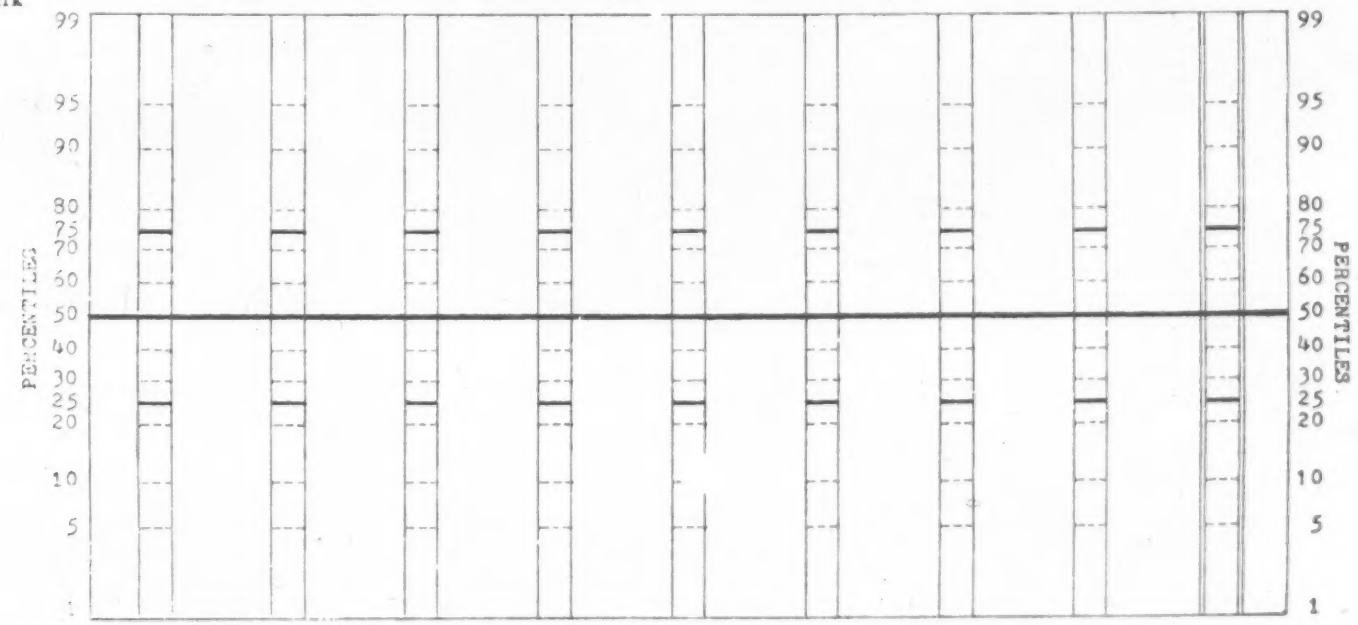
Exam Title Chef No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 Kitchen Management	Section 2 Salad Prep. Cold Plates Sandwiches	Section 3 Meat, Fish, & Poultry	Section 4 Vegetable & Starch Cookery	Section 5 Sauces	Section 6 Desserts and Beverages	Section 7	Section 8	Composite Sections 1, 2, 3, 4, 5, 6.
Raw Score									
Percentile Rank									



PROFILING YOUR OCCUPATIONAL COMPETENCY SCORES

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CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

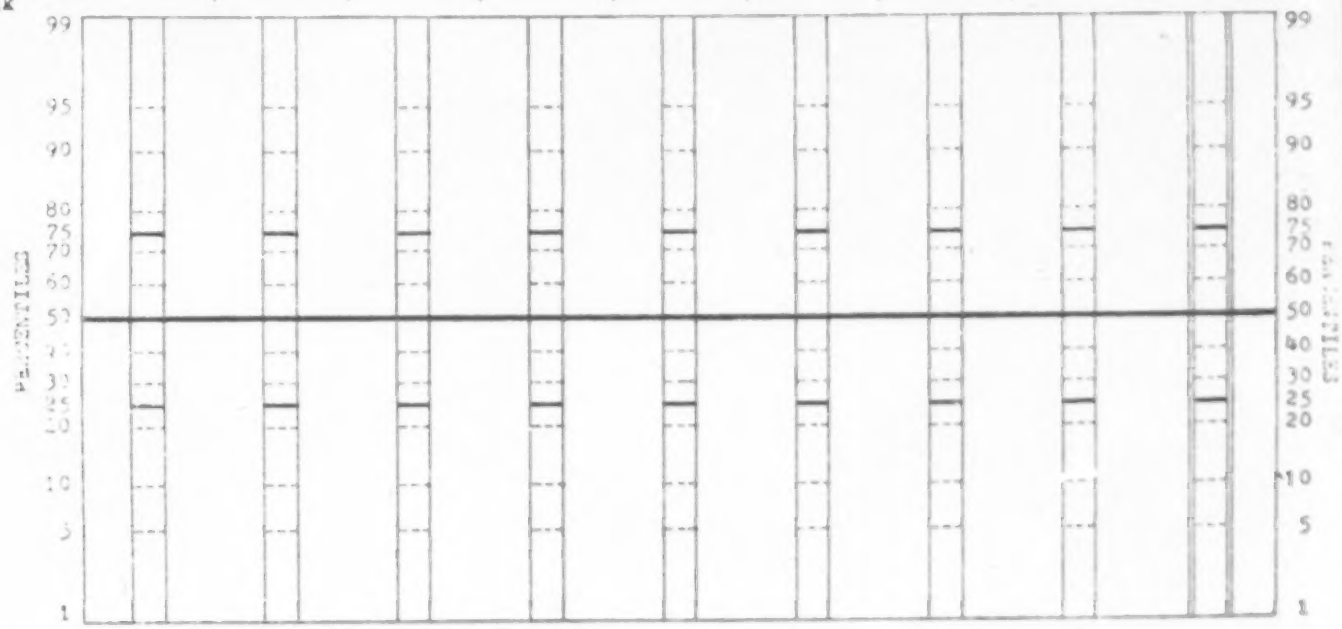
Exam Title Residential Electrician No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 Electrical Theory	Section 2 Installations and Applications	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Composite Sections 1, 2.
Raw Score									
Percentile Rank									



PROFILING YOUR OCCUPATIONAL COMPETENCY SCORES

The numbers that tell you how you did on each section of the examination are in the row marked "Percentile Rank". Your percentile tells you where you rank on an examination section in comparison with other tradesmen in your occupation. These percentiles are based on examination scores earned by Connecticut tradesmen in your occupational field. If your percentile rank is 50, you are just in the middle - that is, one-half of the tradesmen in the group did better than you and one-half did less well.

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CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

Exam Title Industrial Electronics No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 Electron Physics & Magnetism	Section 2 Direct Current	Section 3 Alternating Current	Section 4 Control Devices	Section 5 Basic Circuits	Section 6 Pulse Circuitry (Specialty)	Section 7 Communication (Specialty)	Section 8	Composite Sections 1, 2, 3, 4, 5.
Raw Score									
Percentile Rank									

READING YOUR OCCUPATIONAL COMPETENCY SCORES

The numbers that tell you how you did on each section of the examination are in the row marked "Percentile Rank". Your percentile tells you where you rank on an examination section in comparison with other tradesmen in your occupation. These percentiles are based on examination scores earned by Connecticut tradesmen in your occupational field. If your percentile rank is 50, you are just in the middle - that is, one-half of the tradesmen in the group did better than you and one-half did less well.

Your overall performance on this examination is shown in the column marked "Composite". The composite involves combining your scores for several sections of the examination. It gives you a measure expressed in percentile rank of how you did overall on the occupational examination.

In the column below each percentile rank is drawn your occupational competency profile. For each section of the examination a heavy short line is drawn across the column at the level which corresponds to your percentile rank. The profile graphically shows the strength of your tested occupational competencies.

Think of "percentile" as meaning "percent of people". In your case, the people are tradesmen from Connecticut in your occupation. The percentile shows what percent of the group completing this examination scored no higher than you did. If your percentile rank on one section is 80, you are at the top of 80 percent of the group - only 20 percent made higher scores than yours. If you scored in the 25th percentile, this would mean about 75 percent of the group did better than you on the examination. Thus, a percentile rank always is your relative position within the group. It does not tell how many questions (or what percent of them) you answered correctly.

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CENTRAL CONNECTICUT STATE COLLEGE
New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

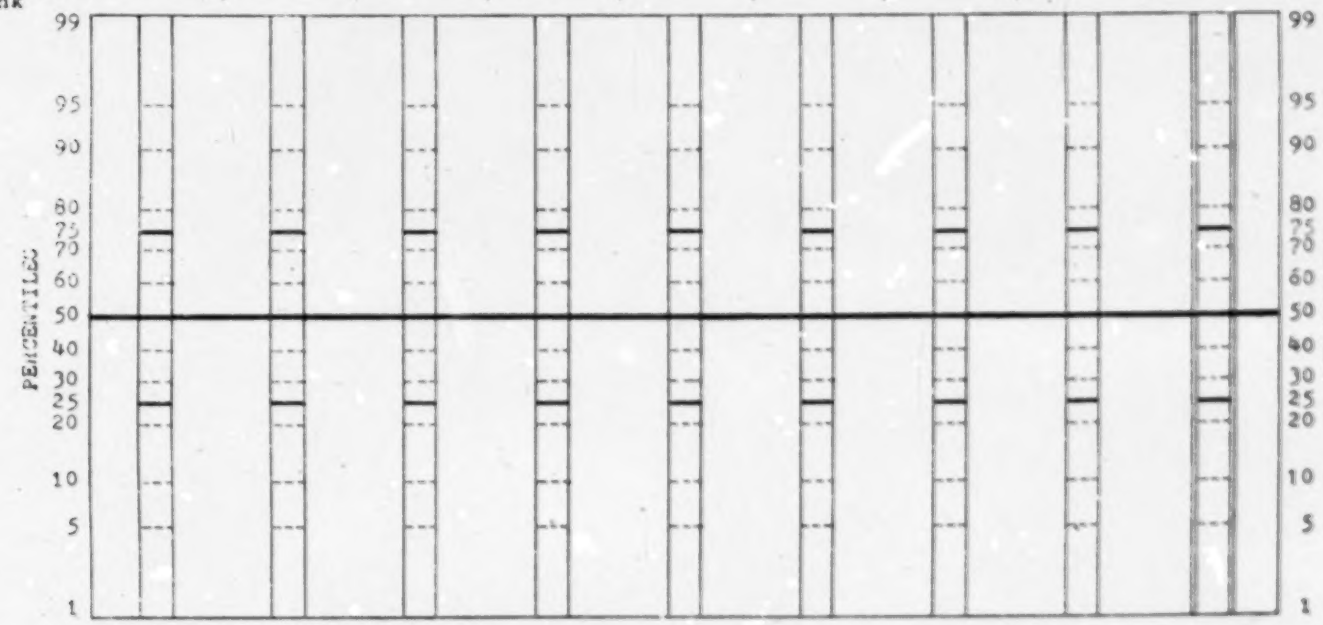
Exam Title Machine Drafting No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 Basic Drafting	Section 2 Working Drawings	Section 3 Power Transmission	Section 4 Materials and Processes	Section 5 (Specialty) Tool Design	Section 6 (Specialty) Electronics	Section 7	Section 8	Composite Sections 1, 2, 3, 4,
Raw Score									
Percentile Rank									



PROFILING YOUR OCCUPATIONAL COMPETENCY SCORES

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New Britain, Connecticut
Vocational Education Department

Occupational Competency Examination - Written Examination Results

Exam Title Machine Trades No.

Exam. Edition/Form

Examiner

Exam Date

	Section 1 General Shop Practice	Section 2 Measurements and Inspection	Section 3 Lathe	Section 4 Milling	Section 5 Grinding	Section 6 Metals and Materials	Section 7 Remote Controlled Mach. (Specialty)	Section 8 Tool & Die (Specialty)	Composite Sections 1, 2, 3, 4, 5, 6.
Raw Score									
Percentile Rank									

PROFILING YOUR OCCUPATIONAL COMPETENCY SCORES

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